TRANSACTIONS

OF THE

AMERICAN

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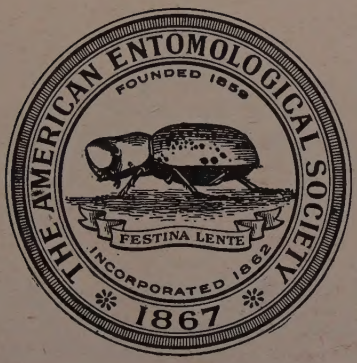

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TRANSACTIONS

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AMERICAN ENTOMOLOGICAL SOCIETY

VOLUME LXXI

STUDIES OF CERTAIN CYRTACANTHACRIDOID GENERA (ORTHOPTERA: ACRIDIDAE)

PART III

BY JAMES A. G. REHN AND JOHN W. H. REHN [1]

Department of Insects, Academy of Natural Sciences of Philadelphia

Numbers One and Two of this series of studies appeared in these "Transactions" in 1939 [2] and 1944 [3] respectively. A general outline of the purpose of the series was presented in Part I. A number of similar studies, along the lines already adopted, are in considerable part completed, and these will appear as promptly as present conditions will permit.

BUCKELLACRIS, ANOTHER NEW NORTH AMERICAN GENUS OF HOLARCTIC TYPE

As pointed out by us last year,[4] an examination of the species which have been referred to the genera *Bradynotes* and *Asemoplus* has made evident that a number of them cannot be so included, and are quite distinct generically. At that time we erected the new genus *Prumnacris* on one of these species. The new genus here presented is another one which, for a logical understanding of

[1] Sanitary Corps, A. U. S., in foreign service.
[2] Part I. "The Podisma Complex." Vol. LXV, pp. 61–96, pls. VI and VII, (1939).
[3] Part II. Prumnacris, A New North American Genus of Holarctic Type." Vol. LXX, pp. 1–21, pls. I and II, (1944).
[4] Trans. Amer. Entom. Soc., LXX, p. 2, (1944).

the locust fauna of the northwestern United States and adjacent Canada, must now be recognized. All of the previously known forms here placed in *Buckellacris* had been erroneously referred to either *Bradynotes* or *Asemoplus*. These were described as *Pezotettix hispidus* Bruner (considered a *Bradynotes* by Scudder in 1897), *Asemoplus nudus* E. M. Walker, *Asemoplus somesi* Hebard and *Bradynotes chilcotinae* Hebard.

In the preparation of this paper the authors have been greatly aided by the cordial cooperation of Mr. E. R. Buckell, of the Canadian Department of Agriculture, and Dr. E. M. Walker, of the University of Toronto. The authorities of the United States National Museum kindly permitted the senior author to examine that institution's series for material of the present genus, and to make use here of the records there contained. Dr. Hugh S. Bostock, of the Canadian Geological Survey, very kindly supplied us with certain information bearing upon Pleistocene conditions in British Columbia.

The present study is based on four hundred and twenty-nine specimens, of which over half, or to be exact two hundred and ninety-eight, are contained in the Philadelphia collections.

We wish to acknowledge the assistance we have received from the American Philosophical Society through the medium of a grant from the Johnson Fund, which aided us in field investigations in 1941, and in the course of which important material here discussed was secured.

BUCKELLACRIS[5] new genus

While the species here placed in this genus have variously been assigned to *Bradynotes* and *Asemoplus,* they are abundantly distinct from the genotypes of those two Nearctic genera, and instead have their nearest affinity with Nearctic *Prumnacris* Rehn and Rehn, and the Palearctic genera *Micropodisma* and *Pseudoprumna* of Dovnar.

[5] In appreciation of the studies of our friend Mr. E. R. Buckell, of the Division of Entomology of the Department of Agriculture of Canada, who has added materially to our knowledge of the Orthoptera of British Columbia, discovered the type species of this genus, and also placed on record most of the field observations which have been made upon it.

From *Prumnacris* Rehn and Rehn[6] the present genus can at once be distinguished by its completely apterous condition in both sexes, its more cylindrical rather than subfusiform general body build in both sexes, its definitely declivent and less produced fastigium, proportionately less ampliate and shorter metazona of the pronotum, this never equalling more than one-third of the total pronotal length and generally less, the quadrate (♂) to subrectangulate (♀) lateral lobes of the pronotum, with the caudal margin subvertical instead of markedly longer than deep with the caudal margin definitely oblique, and the aedeagus of the male internal genitalia having the dorsal valves distally reflexed cuculate or hooded, lacking the preapical frill seen in *Prumnacris*.

From *Micropodisma* Dovnar,[7] *Buckellacris* can readily be distinguished by the more prominent fastigium in the male, and this not at all subbulbous and inflated laterad in the female, as it is in that sex of *M. koenigi*[8]; by the supra-anal plate of the male being not at all trigonal in outline, instead elongate scutellate, with pronounced longitudinal continuous intra-marginal gutters reaching distad for almost the entire length of the plate; by the penultimate abdominal sternite of the male having its distal margin definitely emarginate mesad with an extensive membranous intersternal area in that region, instead of the margin entire, transversely truncate and lacking such a membranous section; by the ovipositor valves of the female being short and relatively stout, particularly the dorsal pair, instead of elongate, slender and compressed; and by the median spicate production of the distal margin of the subgenital plate of the female having converging sides, evenly concave meso-distad, and lacking the paired lateral rectangulate shoulders ventrad of the middle of the ventral valves found in *Micropodisma*.

[6] Trans. Amer. Entom. Soc., LXX, p. 2, (1944). Genotype.—*Asemoplus raimierensis* Caudell. Extensive series of the genotype were examined.

[7] Travaux Inst. Zool. de Acad. Sci. URSS., I, pp. 258, 262 and 265, (1932). Genotype.—*Micropodisma koenigi* (Burr) [*Podisma koenigi* Burr]. We have examined a pair of the genotypic species bearing the following data: Bakuriani, [Georgia,] Transcaucasia, elev. 1600–2000 meters; IX, 10–13, 1927; (Ramme coll.); [Hebard Cln., received in exchange from Berlin Zoological Museum, determined by Ramme].

[8] Dovnar says the median carina of the pronotum is "nicht entwickelt" in *Micropodisma*, but while it is obsolete on the prozona in both sexes of the specimens of *M. koenigi* now before us, it is definitely present, although not prominent, on the metazona in the male and there intimated in the female.

From *Pseudoprumna* Dovnar,[9] the present genus can at once be separated by its definitely uninflated and not at all bulbous fastigium, which in *Pseudoprumna* is even more markedly developed in this respect than in *Micropodisma* and in both sexes; by the shorter and less caudad extended pronotum, the lateral lobes of which are more subquadrate to rectangulate and by no means as longitudinal, and the caudal margins of which latter are not decidedly oblique, as they are in *Pseudoprumna*; by the male supra-anal plate also differing as from *Micropodisma;* by the male cerci being simple, styliform and acutely pointed, rather than subflabellate distad; by the male subgenital plate being not at all transverse and definitely subrostrate distad, instead of strongly transverse, marginally ampliate laterad and prumnoid in general development; and by the ovipositor valves of the female being short and relatively stout, instead of slender, attenuate and compressed, as in *Pseudoprumna.*

When compared with the Nearctic genus *Bradynotes* Scudder (genotype *B. obesa* (Thomas)), in which several of its species had been placed, *Buckellacris* can at once be distinguished by its more slender, less toad-like form, which is also less deplanate ventrad; by its fastigium being more produced, less declivent, narrower and with its disk not excavate continuously with the frontal costa, which latter is at most but very slightly and incompletely sulcate, and the lateral borders of the fastigium not definitely continuous with those of the frontal costa, as they are in *Bradynotes*; by the breadth of the head across the genae not markedly greater than that across the eyes; by the pronotum not being strongly ampliate caudad, the lateral shoulders not marked structurally; by the caudal margin of the pronotal disk being non-emarginate mesad; by the prosternal spine being well developed and the mesosternal lobes proportionately deeper and less strongly transverse; by the furcula of the male being distinct, even when re-

[9] Travaux Inst. Zool. de Acad. Sci. URSS., 1, pp. 258, 262 and 265, (1932). Genotype (by monotypy).—*Pseudoprumna baldensis* (Krauss) [*Podisma baldensis* Krauss]. We have examined two pairs of this species, with the following data: Highest peak Mt. Baldo, Trentino, Italy; VIII, 20, 1921; (Ramme-Spaney); 1 ♂, 1 ♀; [Hebard Cln., received in exchange from Berlin Museum and determined by Ramme]. "Very high," Trentino, Italy; (R. Cobelli); 1 ♂, 1 ♀; [Hebard Cln., received in exchange from and determined by H. Karny].

duced; by the male supra-anal plate having well-developed preapical lateral marginal shoulders, the surface of the plate deeply sculptured with the medio-longitudinal sulcus pronounced; and by the limbs being of the type usual in the group, the caudal femora particularly less inflated and more attenuate.

Contrasted with the Nearctic genus *Asemoplus* Scudder (genotype *A. montanus* (Bruner) [10]), in which certain of the species here treated had also been placed, *Buckellacris* is readily recognized by its completely apterous condition and less compressed form; by its narrower and more definitely developed fastigium, while the inter-ocular space at vertex is narrower in both sexes, and the lower face and genae are not definitely inflated, as they are in *Asemoplus;* by the pronotum being subdeplanate dorsad, with lateral shoulders appreciable, instead of broadly rounded dorsad as in *Asemoplus*; by the prozona of the pronotum in the male being equal to definitely more than two-thirds of the whole pronotal length; by the caudal margin of the pronotal disk being non-emarginate mesad; by the lateral lobes of the pronotum being subquadrate (♂) to subrectangulate (♀) with caudal margin subvertical, not definitely oblique or sinuate; by the supra-anal plate of the male being more elongate scutellate, not truly trigonal, the preapical lateral marginal angles definite, and by the aedeagus of the male internal genitalia being very different.[11]

GENOTYPE: *Bradynotes chilcotinae* Hebard.

Generic features.—General form melanoploid, apterous in both sexes, more fusiform in ♀ than in ♂.

Head in cephalic aspect hardly (in ♂ of certain forms) or but moderately (♀) narrowing dorsad, breadth across genae never markedly greater than across eyes; genae hardly (♂) or but moderately (♀) tumid; fastigium as seen from dorsum short, but moderately produced, broadly obtuse-angulate to (rarely) rectangulate, broader than inter-ocular space, in profile appreciably declivent to fastigio-facial juncture, dorsal surface of fastigium very shallowly to quite definitely excavate; frontal costa (usually distinctly) narrower than interocular space, margins subparallel or somewhat diverging ventrad, obsolete on ventral portion of face, shallowly sulcate about median

[10] For photographic illustrations of both sexes of *Asemoplus montanus* see Rehn and Rehn, Trans. Amer. Entom. Soc., LXX, pl. I, figs. 13 and 14, pl. II, figs. 16 and 18, (1944).

[11] For the character of this organ in *A. montanus* see Rehn and Rehn, Trans. Amer. Entom. Soc., LXX, p. 6, fig. 10, (1944).

ocellus and to a variable extent ventrad of same; lateral (supplementary) facial carinae weakly marked to obsolete. Eyes somewhat more prominent in males than in females, never decided. Antennae in length subequal to or somewhat exceeding that of head and pronotum combined.

Pronotum faintly to appreciably broadening caudad as seen from dorsum, in no way sellate, at most but very weakly strangulate in the male sex of several species, the caudal broadening, when evident, involving only the caudal half of the pronotum; lateral portions of disk broadly rounding into lateral lobes, non-carinate and almost unmarked structurally, but often well indicated by color pattern; cephalic margin of disk transverse truncate to subconvex, caudal margin subtruncate; transverse sulci well impressed in male, less so in female (in both sexes least decided in *B. chilcotinae*); length of metazonal disk equal to half or slightly less than half the prozonal length, or never more than one-third the total pronotal length; median carina in male well marked but low on the metazona and to a variable degree cephalad on the prozona, in the female present as a fine line, usually throughout but more evident on the metazona; lateral lobes of pronotum in proportions subquadrate to slightly longitudinal, cephalic and caudal margins but moderately oblique subconvergent ventrad, sculpturing of dorsal half of lobes more pronounced in ♂ than in ♀, transverse sulci there accentuating the subbullate intervals between the same in certain species.

Tegmina and wings completely lacking.

Auditory tympana well developed in both sexes, relatively large, ovate to subreniform in outline.

Prosternal process conical, erect, varying in sharpness specifically. Interspace between mesosternal lobes transverse in both sexes, subcuneate in outline and narrowing cephalad in ♂, ♀ with breadth equal to or exceeding that of a single mesosternal lobe.

Cephalic and median femora in ♂ stout, moderately inflated. Caudal femora robust to relatively slender, and in both sexes, sometimes but not always more robust proportionately in ♂, their apices reaching to or slightly surpassing (usual in ♂) the abdominal apex; caudal tibiae with 7 to 11 [12] spines on external margin, no external apical spine,[13] internal margin with 8 to 11 spines, internal spurs subequal in length and moderately falcate distad.

Male with furcula ranging in development from a pair of minute rounded nodes (*hispida*) to well-developed trigonal lobes; supra-anal plate scutellate, subequal in proximal breadth and length or slightly longer than broad, apex obtuse-angulate, surface deeply sculptured with a pair of longitudinal broad lateral parallel or moderately converging, gutter-like, impressions and a narrower median sulcation, which latter may extend to the apex of the plate or distad pass into a preapical subrectangulate or trigonal deplanate and non-excavate section; cerci styliform, subcompressed, tapering as seen in profile;

[12] The extremes here given in the number of spines on this margin will be found in the very limited series of specimens of *B. hispida* which have been examined.

[13] Except in an anomalous individual discussed under *B. hispida*.

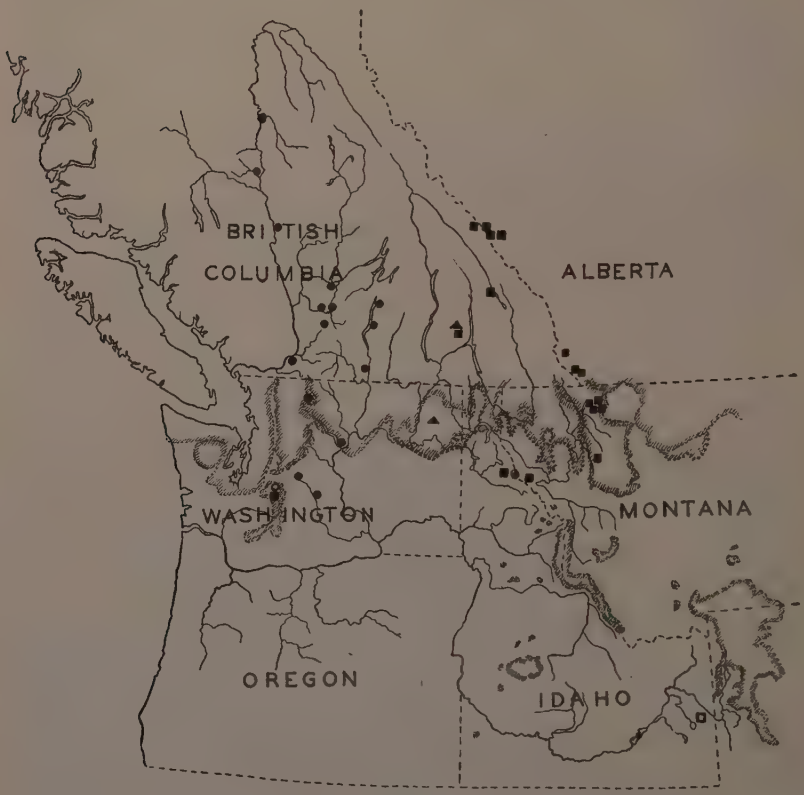
subgenital plate scoop-like, slightly broader proximad than long, its dorso-lateral margins, as seen from dorsum, subsigmoidally converging to the narrow, briefly, subrostrate apex; epiphallus (see figs. 15 and 18) with ancorae short, peg-like, bluntly rounded at apices, and moderately converging in trend; aedeagus (see figs. 16, 17 and 19) with the extremities of the dorsal and ventral valves of the dorsal lobe sharply and narrowly bent caudad in a cap-like fashion over the phallotreme (Snodgrass), ventral lobe of the aedeagus varying specifically in length and shape.

Female with supra-anal plate trigonally sublanceolate, apex obtuse-angulate, converging lateral margins subsinuate, surface sulcate or impressed meso-proximad, occasionally subimpressed distad; cerci short, stout, conical; ovipositor valves short and stout, dorsal surface of dorsal valves excavate distad, dorso-external margins of excavate portion of dorsal valves sparsely serrulate in proximal section of that area, apices of both pairs of valves in profile moderately recurved, lateral plate of ventral valves acute lanceolate distad; subgenital plate with distal margin strongly and acutely produced meso-distad, markedly concave ventrad of base of each ventral ovipositor valve.

Distribution.—Extending from south-central British Columbia (Chilcotin area near the middle course of the Fraser River), the mountains of the lower course of the Fraser River, the Monashee (sometimes called the Gold Range) and Selkirk Ranges of the more southern portion of that province, and the Canadian Rocky Mountains from as far north as the vicinity of the Kicking Horse Pass, southward to at least the international boundary; south of that boundary the genus extends into three areas, first, as far in the Cascade uplift of Washington as Mt. Rainier, second, into northeastern Washington as far as Colville Valley, and third, into northern Idaho and northwestern Montana as far southward as Wallace, Idaho, and Haugan and the Swan Range in Montana, with an additional isolated element in southeastern Idaho (*B. nuda relicta*).

The genus is an inhabitant of at least four life zones, ranging from as low as the Transition to as high as the Arctic Alpine, and it may even intrude locally into very limited sections of the Upper Sonoran in the dry Columbia-Okanagan interior of British Columbia and Washington. It appears to be absent from the Puget Sound area, the Olympic Peninsula and the southwestern lowland of Washington, and from most of Columbia Plains area, as well as all of central-eastern and southeastern Washington, and we have

no evidence of its presence in any but two limited sections of Idaho. In Montana it apparently does not range eastward of the Continental Divide to any appreciable extent.



Known distribution of the species of the genus *Buckellacris*. Solid dots—*B. chilcotinae chilcotinae*. Circle—*B. chilcotinae tacoma*. Triangles—*B. hispida*. Solid squares—*B. nuda nuda*. Hollow square—*B. nuda relicta*. Approximate moraine of Spokane (in Montana, Iowan) glaciation shown by crosses. Approximate boundaries of montane glaciations shown by dots and dashes. Approximate moraine of Wisconsin (in Puget Sound area, Vashon) glaciation shown by dots. (Glacial features after Antevs, 1929.)

Probable history.—As is the genus *Prumnacris*, the same factors for which we have already discussed in considerable detail,[14]

[14] Trans. Amer. Entom. Soc., LXX, pp. 8–10, (1944).

Buckellacris is a member of a phylum of Old World relationship and origin, but of rather different history, probably somewhat more ancient in its entrance into North America than that of which *Prumnacris* is a member. In our earlier paper we stated our belief that *Prumnacris,* or its progenitor, dates in our territory from the Puyallup Interglacial, which latter is clearly indicated in the deposits of the Puget Sound region between the Admiralty and Vashon Glaciations.[15] In the case of *Buckellacris,* however, its present distribution is more complex, and so clearly dated by the degree of differentiation of certain subspecies that a definitely longer period of development in North America was required. It is fair to assume, therefore, that its entrance into our continent was prior to the period of the Puyallup Interglacial. The Vashon Glaciation would seem to be of Wisconsin age,[16] and Puyallup Interglacial deposits, which in western Washington separate the Vashon and the earlier Admiralty glacial stages, may be equivalent to the Sangamon Interglacial of the Middle West.

It is quite conceivable that the Wisconsin stage of glaciation was responsible for *Buckellacris nuda nuda* being isolated on Mount Rainier, Washington, far removed from the major area of its present-day occurrence and also for its extermination over all of the area between the Cascades and the Selkirk area in British Columbia and even east of the latter district in Washington, where in certain sections, at least, it unquestionably had been present. This isolation, reflected to-day in the Mount Rainier colony, was sufficiently recent to be dated definitely posterior to those which established and differentiated *B. chilcotinae tacoma* in the same general environment on Mount Rainier, and similarly isolated and evolved *B. nuda relicta* in the Caribou Mountains of southeastern Idaho. The two latter movements were clearly made prior to the time of the Sangamon Interglacial, and may have been due to the Spokane Glaciation, which Bretz [17] suggests should be either Iowan or Illinoisan in age. Leverett [18] considers that a pre-

[15] See Bretz, "Glaciation of the Puget Sound Region." Bull. no. 8, Washington Geological Survey, 1913.
[16] See Antevs, Bull. Geol. Soc. of Amer., XL, pp. 650–651, (1929).
[17] Journ. of Geol., XXXI, pp. 647–648, (1923).
[18] Bull. Geol. Soc. of Amer., XXVIII, p. 143, (1917).

Spokane till beneath the loess of eastern Washington is of Kansan age, and Daly [19] seems to feel that a prolonged period of rock-cutting observed in the Rocky Mountains area with which the present problem is associated, may have been done at a time corresponding with the Yarmouth Interglacial stage of the Middle West.

As to the comparative or proportionate chronology for these possible movements, Bretz [20] concludes from extensive computations that the lapse of time since the Spokane Glaciation has been two and one-half times as great as that since the Wisconsin Glaciation. From Daly's 1934 discussion, here quoted, it is evident that he considered the interglacial responsible for the great rock-cuttings in the northern Rockies to have been a lengthy one. It is therefore possible that the first of the southward movements we are discussing (i.e. that of *B. n. relicta*) may have been caused by an ice-sheet as old as the Kansan of the Middle West, and that the advance and retreat of the ice-fronts of Spokane and Wisconsin age timed the southern migrations which were responsible, first for the differentiation and alpine isolation of *B. chilcotinae tacoma,* and second for the marooning of undifferentiated *B. n. nuda* in the southern Cascades of Washington, i.e. in the Mount Rainier district. It is fair to assume, on the differentiation ratio, the first was the earlier, and thus may have been due to Spokane times, and the second hardly can be older than Wisconsin. Apparently the present-day distribution of *B. c. chilcotinae* reflects the possibility that the post-glacial withdrawal of that form may yet be under way, which would account for the fact that this subspecies, which

[19] Daly ("Changing World of the Ice Age," p. 36, (1934)), writes: "The Yarmouth or second Interglacial stage has been shown to have been much longer than either of the other two Interglacial stages. . . . Already too, there has been demonstration of an exceptionally long Interglacial stage registered in the Rocky Mountains province. For example, the Saint Mary Valley of Montana was cut 250 to 300 meters deeper into bed rock after it was occupied by an early Pleistocene glacier, and probably most of this cutting was done in one of the Interglacial stages. In Idaho similar deepenings of valleys cut in strong rocks was of the order of 400 meters, between the times of an early Pleistocene glaciation and a later glaciation; the Post-Glacial deepening, largely in much weaker, Glacially deposited material, being 30 meters or less. It may yet be possible to show that this prolonged period of rock-cutting corresponded with the Yarmouth stage of the Middle West."

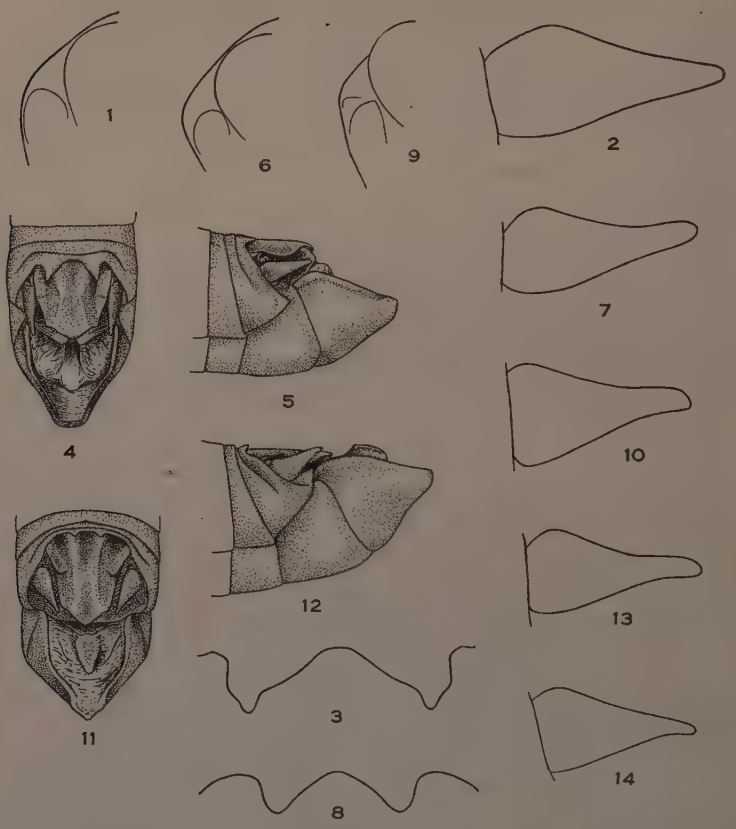
[20] Amer. Journ. of Sci., (5), VIII, p. 342, (1924).

even in the northern part of its distribution frequents timber-line conditions, to the southward is also found as low as the vicinity of one thousand feet above sea-level in the Lake Okanagan region of British Columbia, and on the western border of the Columbia Plains in Washington.

Clearly *B. nuda* was quite widely distributed over the territory now included in southern British Columbia prior to the Wisconsin glaciation, but whether it was so distributed previous to the time of the earlier glaciation which pushed the ancestral stock of *B. n. relicta* so far southward that it is to-day stranded in the mountains of southeastern Idaho, remains to be determined. Certainly the typical form of *nuda* was so distributed prior to the presumably Wisconsin glaciation which drove it south in the Washington Cascades, and probably in other areas of that state, and apparently exterminated it elsewhere in Washington and over British Columbia west of the Rocky Mountain Trench,[21] except for the population now found high up in the Canadian Selkirks (Mt. Kokanee), which may, and probably does, represent an early post-glacial repopulation and not a survival group. As for *B. hispida* we are warranted in assuming that it survived the Wisconsin in areas of northeastern Washington where it now occurs, and which were unglaciated at that time, and that its present occurrence relatively low down in valleys in the Selkirk section of British Columbia is due to repopulation in post-glacial times. Definitely *B. hispida* is a form of lower levels and less alpine conditions than *B. nuda*. Of the two we believe that *nuda* is the older, and that *hispida* may have developed from an isolated population of the former in a warm, early interglacial, but this can be no more than inference as far as present knowledge is concerned.

In all probability the present British Columbia and Alberta ranges of *Buckellacris* represent post-glacial reestablishments, as virtually all of southern British Columbia and the Cordilleran section was covered by ice in Wisconsin times.

[21] Fenneman ("Physiography of the Western United States," p. 201 (1931)), has given a concise description of this depression.



Buckellacris chilcotinae chilcotinae (Hebard). Riske Creek, Chilcotin District, British Columbia. Male (paratype). Fig. 1.—Profile of fastigio-facial angle. Fig. 2.—Outline of cercus. Fig. 3.—Outline of furcula. Male (paratype). Fig. 4.—Dorsal view of apex of abdomen. Fig. 5.—Lateral view of apex of abdomen.

Buckellacris chilcotinae tacoma new subspecies. Shadow Lake, Yakima Park, Mt. Rainier National Park, Washington. Male (type). Fig. 6.—Profile of fastigio-facial angle. Fig. 7.—Outline of cercus. Fig. 8.—Outline of furcula.

Buckellacris hispida (Scudder). Colville Valley, Washington. Male (type). Fig. 9.—Profile of fastigio-facial angle. Fig. 10.—Outline of cercus. Sandon, British Columbia. Male (paratype of *Asemoplus nudus* E. M. Walker). Fig. 11.—Dorsal view of apex of abdomen. Fig. 12.—Lateral view of apex of abdomen.

Key to the Forms

Males

1. Size averaging larger (body length, 19.9 mm., with range from 16.8 to 25). Interantennal rostrum less pronounced, more broadly rounded in outline as seen in profile (see figs. 1 and 6). Pronotum with transverse sulci not strongly marked, and on dorsum relatively shallow in impression. Cerci proportionately narrower at base. Interspace between mesosternal lobes in least width subequal to that of one of the lobes. Coloration usually duller and less contrasted. (Furcula well developed deplanate trigonal structures. Supra-anal plate with lateral margins lacking a distinct subimbricate shoulder mesad.).....2

   Size averaging smaller (body length, 17.9 mm., with range from 15 to 20.3). Interantennal rostrum more pronounced, more strongly and less broadly rounded in outline as seen in profile (see fig. 9). Pronotum with transverse sulci strongly marked, and on dorsum well impressed. Cerci proportionately broader at base. Interspace between mesosternal lobes in least width less than that of one of the lobes. Coloration usually more contrasted. (For internal genitalia, see figs. 17 to 19.).....3

2. Furcula with lobes larger, in outline less trigonal and distad attenuately submammilliform, definitely separated from one another, with a considerable median marginal diastema between their bases.

   chilcotinae chilcotinae (Hebard)

   Furcula with lobes smaller, in outline more trigonal and not definitely submammilliform distad, more contiguous proximad and not separated from one another by a definite median diastema.

   chilcotinae tacoma new subspecies

3. Interocular portion of vertex and disk of fastigium more shallowly excavate. Furcula merely a pair of very minute nodes. Supra-anal plate with lateral margins bearing a distinct subimbricate median shoulder, breaking the continuity of the margin (see fig. 11). Prosternal process rather sharply acute. Cephalic and median femora but moderately inflated. (For internal genitalia, see fig. 17.).....*hispida* (Bruner)

   Interocular portion of vertex and disk of fastigium more deeply excavate. Furcula consisting of a pair of well developed deplanate trigonal plates. Supra-anal plate with lateral margins lacking a distinct subimbricate median shoulder. Prosternal process blunter and less definitely acute. Cephalic and median femora more decidedly inflated. (For internal genitalia, see figs. 18 and 19.).....4

Buckellacris nuda nuda (E. M. Walker). Banff, Alberta. Male. Fig. 13.—Outline of cercus.

Buckellacris nuda relicta new subspecies. Tin Cup Divide, Idaho. Male (type). Fig. 14.—Outline of cercus.

(All much enlarged)

4. Caudal femora proportionately longer and more slender, in length slightly exceeding one and four-fifths times the combined length of head and pronotum. Antennae longer, averaging slightly more than one and one-half times the combined length of head and pronotum. Head as seen in cephalic aspect relatively narrower, genae less inflated.
nuda relicta new subspecies

Caudal femora shorter and deeper, in length averaging less than one and three-fourths times the combined length of head and pronotum. Antennae shorter, averaging less than one and one-half times the combined length of head and pronotum. Head as seen in cephalic aspect relatively broader, genae more inflated....*nuda nuda* (E. M. Walker)

Females [22]

1. General form averaging stouter. Interspace between eyes at vertex subequal in breadth to transverse width of a single eye as seen in dorsal aspect. Pronotum with transverse sulci less deeply impressed, more finely engraved. Caudal limbs proportionately stouter and more robust.....2

General form averaging more slender. Interspace between eyes at vertex appreciably narrower than transverse width of a single eye as seen in dorsal aspect. Pronotum with transverse sulci more deeply and appreciably impressed, more sharply cut. Caudal limbs proportionately more slender and elongate.....3

2. As a whole averaging larger.....*chilcotinae chilcotinae* (Hebard)

As a whole averaging smaller.....*chilcotinae tacoma* new subspecies

3. Fastigio-facial angle as seen in profile more obtuse-angulate. Prosternal process sharper, more produced and acute.....*hispida* (Bruner)

Fastigio-facial angle as seen in profile more broadly rounded. Prosternal process blunter, less produced or acute.....4

4. Caudal femora proportionately longer and more slender. Antennae longer.....*nuda relicta* new subspecies

Caudal femora proportionately shorter and deeper. Antennae shorter.
nuda nuda (E. M. Walker)

Buckellacris chilcotinae (Hebard)

Composed of two subspecies, here treated individually. The distribution of the species as a whole is the aggregate of the ranges of the subspecies.

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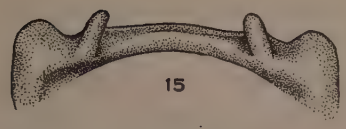
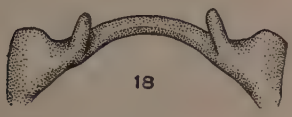
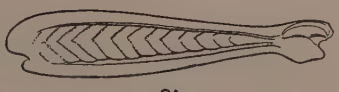
[22] The more important features distinguishing the various forms are found in the male sex, and the key to the females is, therefore, largely comparative and less definitely analytic. However, with the aid of the illustrations here given, it should enable the student to place his material.







Buckellacris chilcotinae chilcotinae (Hebard). Riske Creek, Chilcotin District, British Columbia. Male (paratype). Fig. 15.—Ancorae of epiphallus as seen in dorsal aspect (greatly enlarged). Male (paratype). Fig. 16.—Aedeagus as seen in caudal aspect (greatly enlarged).

Buckellacris hispida (Scudder). Colville Valley, Washington. Male (type). Fig. 17.—Aedeagus as seen in caudal aspect (greatly enlarged).

Buckellacris nuda nuda (E. M. Walker). Upper Little St. Mary Valley, Glacier National Park, Montana. Male (paratype of *Asemoplus somesi* Hebard). Fig. 18.—Ancorae of epiphallus as seen in dorsal aspect (greatly enlarged). Fig. 19.—Aedeagus as seen in caudal aspect (greatly enlarged). Banff, Alberta. Male. Fig. 20.—Outline of caudal femur (×4).

Buckellacris nuda relicta new subspecies. Tin Cup Divide, Idaho. Male (type). Fig. 21.—Outline of caudal femur (×4).

Buckellacris chilcotinae chilcotinae (Hebard)

(Text-figs. 1 to 5, 15 and 16, pl. I, fig. 22, pl. II, fig. 28.)

1897. *Bradynotes expleta* Scudder, Proc. U. S. Nat. Mus., xx, p. 85. (In part only.) [♀; Easton, Washington.]

1922. *Bradynotes chilcotinae* Hebard, Trans. Amer. Entom. Soc., xlviii, p. 58, pl. III, figs. 6–8. [♂ (*type*), ♀; Riske Creek, Chilcotin, British Columbia (type locality); Big Bar (Mountain), British Columbia.]

Type.—♂; Riske Creek, Chilcotin, British Columbia, July 22, 1921. (E. R. Buckell.) [Canadian National Collection.]

This subspecies is distributed over much of the interior of British Columbia from the bend of the Fraser River southward, east to

Kamloops and Okanagan Lake and Okanagan Valley on the southern border, and in the Cascade Mountains and adjacent areas of Washington south at least as far as the Stampede Pass area (Easton) and the vicinity of Ellensburg.

Our identification of *chilcotinae* has been made from an extensive series of paratypes in the Academy of Natural Sciences of Philadelphia and in the Hebard Collection there deposited.

The single female specimen originally considered by Scudder to represent his *Bradynotes expleta* (vide supra), has been examined in the collection of the United States National Museum. It is not a *Bradynotes,* and is not congeneric with the subsequently selected lectotype of the species,[23] instead representing the then (1897) undescribed *Buckellacris chilcotinae chilcotinae.*

The original description and accompanying figures given by Hebard for *chilcotinae* clearly present the features of the typical subspecies, and the student is referred to these for details of the characteristics of *B. c. chilcotinae.* Our discussion here, and our amplifying figures, deal chiefly with variational matters and the relation of *B. c. chilcotinae* to *B. c. tacoma* here described.

Morphological variation.—General bulk fluctuation is usually associated with that in general size, for which the accompanying measurements should be consulted. There are, however, certain lines of individual bulk variation which, on the basis of the considerable Riske Creek series now before us, are not strictly correlated with general size. The most evident is the degree of inflation laterad of the prozona of the pronotum, which tendency shows the same degree of individual fluctuation found in a number of other melanoploids of holarctic relationships. While more evident in the male than in the female, this variation is found in both sexes.

The interocular space at vertex varies appreciably in width in both sexes, but more definitely so in the male than in the female, and similarly variable is the outline of the fastigium as seen from the dorsum, the range in both being much the same as that already discussed by us as found in *Prumnacris rainierensis.*[24] As in that genus and species the relative degree of excavation of the fastigial disk and the breadth of the dorsal portion of the frontal costa vary

[23] See Rehn and Hebard, Proc. Acad. Nat. Sci. Phila., 1912, p. 77, (1912).
[24] See Trans. Amer. Entom. Soc., LXX, p. 11, (1944).

individually to an appreciable degree in *B. c. chilcotinae*. The whole pattern of structural variation of the head and pronotum is largely parallel to what we have already discussed as encountered in *Prumnacris rainierensis*.

The furcula of the male varies considerably in the extent to which its lobes are produced distad, although the submammillate form of the lobes is distinctive, and thus differs from the quite trigonal shape found in *B. c. tacoma*. The arms of the furcula, however, are always well separated by an interval of the tergal margin, and the lobes are never in the close juxtaposition they have in *B. c. tacoma*. In brief the furcula arms of *B. c. chilcotinae* always straddle the medio-longitudinal elevated area of the male supra-anal plate rather than lie on top of the paired ridges of the same.

While the supra-anal plate of the male varies considerably in the exact shape of its immediate apex, and the relative breadth of the usually broad medio-longitudinal elevation, and also in the strength of the medio-longitudinal sulcus, as has been well described and figured by Hebard,[25] in none of the males before us is there any appreciable approach to the female type of supra-anal plate found by us in certain male individuals of *Prumnacris rainierensis*.[26]

The ovipositor jaws of the female show a considerable degree of individual variation in robustness and attenuation in the series from Riske Creek, Chilcotin, alone, and this plasticity is equally evident in both the dorsal and ventral valves. The proximo-lateral tooth on the ventral valves also varies appreciably in its relative size and emphasis.

In the male sex we find a very appreciable amount of variation in the extent to which the cephalic and median femora are inflated, in the most decided extreme the tumidity being very marked, and these parts then approach what we find as individual variants in species of the North American melanoploid genus *Aeoloplus*. We also find a rather unusual condition in that in the female sex there is an appreciable indication of the same tendency, and Riske Creek females show a definite amount of plasticity in the stoutness of particularly the cephalic femora.

[25] Trans. Amer. Entom. Soc., XLVIII, p. 59, pl. III, figs. 6 and 7, (1922).
[26] Trans. Amer. Entom. Soc., LXX, pp. 13 to 14, text-fig. 5, (1944).

The caudal femora in the Riske Creek, Chilcotin, series, and particularly in the male sex, vary quite definitely in their relative depth and robustness. A check of the depth to length of these femora in the more extreme of the males in that representation shows a range in this ratio of depth to length of from 4.57 to 3.5, while the Hart's Pass male series gives 4.11 to 3.2, showing an average stouter caudal femur in the latter series. A check of all the males examined of *B. c. tacoma* gives a range in that race of 4.37 to 3.67. From this it is evident that the average greater robustness of the Hart's Pass males is not a gradational condition, but instead a localized tendency toward heavier femora. There does not appear to be any definite correlation of more robust caudal femora in the male with the more extreme inflated condition of the cephalic and median femora.

Size variation.—The following dimensions (in millimeters) cover variation evident from previously studied or here recorded material.

The figures here presented show that in any considerable series a fair range in individual size variation will be found. A correlation of the averages of these dimensions, where more than a single individual of the sex has been measured, shows very clearly that the smallest individuals are from localities with the highest elevations (i.e. Big Bar Mountain, B. C., and Hart's Pass, Washington), and the largest individuals are from some of the lowest elevations from which the subspecies is known. While this is as would be expected, it is interesting to note that *B. c. tacoma,* which lives in a truly alpine environment shrouded most of the time in glacier-born mist, is no smaller than the specimens of *c. chilcotinae* from one of the highest elevations from which we have seen the latter (i.e. 6,197 feet at Hart's Pass, Washington), although almost all other individuals of *c. chilcotinae* from lower elevations are appreciably larger than either *c. tacoma* or subalpine material of *c. chilcotinae.* The few specimens from lower levels which are of relatively small size, are in several cases from limited intrusions into environments which are apparently unfavorable to the species, and beyond which it is not known to extend any distance into far greater areas of similar conditions (as the Wapato Indian Reservation on Lake Chelan, and Ellensburg, Washington).

	Length of body	Length of pronotum	Length of caudal femur
♂, Riske Creek, B. C., *type*, ex Hebard	21.4	4.2	11.7
♂♂, Riske Creek, B. C., *paratypes*, range of 85 measured by Buckell, ex Hebard	21–25	4–5	11–12.5
♂♂, Big Bar [Mtn.], B. C., range of 4, ex Hebard	17–18.5	3.7–3.8	10.3–10.4
♂, Aspen Grove, B. C.	20.2	3.9	11.5
♂, Aspen Grove, B. C.	22	4.4	12.3
♂, Kelowna, B. C.	22.5	4	11.9
♂, Oliver, B. C.	21	4.5	12.3
♂, Oliver, B. C.	21.6	4.2	12
♂, Hart's Pass, Wash.	16.8	3.7	10.2
♂, Hart's Pass, Wash.	19.7[27]	3.7	11.2
♂, Siwash, Lake Chelan, Wash.	19.5	4.4	11.7
♀, Riske Creek, B. C., *allotype*, ex Hebard	24	4.8	13.4
♀♀, Riske Creek, B. C., *paratypes*, range of 78 measured by Buckell, ex Hebard	24–40[28]	4.8–6	12.5–15
♀♀, Big Bar [Mtn.], B. C., range of 2, ex Hebard	21.5–22.2	4.2–4.3	12.3–12.2
♀, Nicola, B. C.	26.5	5	13.8
♀, Mt. Wahleach, B. C.	25.5	5	13.3
♀, Aspen Grove, B. C.	25	4.9	13.3
♀, Aspen Grove, B. C.	30	5.7	15.6
♀, Oliver, B. C.	24	5	14.5
♀, Oliver, B. C.	27	5.5	15.5
♀, Hart's Pass, Wash.	23.5	4	12.3
♀, Hart's Pass, Wash.	25.5	4.7	12.5
♀, Wapato Indian Res., Washington	29.5	5.5	15
♀, Easton, Washington (original female of *Bradynotes expleta*)	28.5	5	14.5
♀, Ellensburg, Washington	25.5	5.2	14.3

[27] Abdomen slightly extended to permit the extrusion of the internal genitalia.

[28] The specimen which supplied the latter measurement must have had the abdomen greatly distended, perhaps with eggs, as no dry specimen with 15 millimeter caudal femora is in length within eight millimeters of the 40 given.

Coloration.—In the original description Hebard has presented a detailed analysis of the coloration of this form, drawn from material which at that time was definitely fresher and nearer the life coloration than the same Riske Creek specimens are to-day. The student is referred to the original description for this information. Our Hart's Pass series, which has been collected but three years, is, in the male sex at least, more brilliantly colored than that from Riske Creek, and this is doubtless due to its relatively fresher condition.

The series from Aspen Grove, Nicola Lake and the various Okanagan localities (Kelowna, Oliver and Vernon) average definitely paler and more greenish gray in base color in both sexes, and the same is true of the male from Siwash, Lake Chelan, Washington. The two Kelowna males have the darker maculae strongly marked, and thus sharply contrasted with their pale base color. None of the Kelowna, Oliver, Vernon or Lake Chelan specimens, or all of those from the lower levels and all probably from sage or a similar type of environment, show any reddish on the ventral or internal faces of the caudal femora, these areas being as pale as the general ventral coloration. The Hart's Pass individuals, on the other hand, agree with virtually all of the Chilcotin series in having these areas definitely washed with tones of red. It is probable there is a correlation of the lack of reddish on the caudal femora with the semi-arid environment in which those specimens were taken, and the pale color of the Aspen Grove representation may have a somewhat similar explanation.

Distribution.[29]—Interior British Columbia north at least to Quesnel, on the Fraser River at approximately 53° N., not far south of the big bend of that stream, southward to the United States border, west only as far as the lower course of the Fraser (Mt. Wahleach), east as far as Kamloops on the Thompson River and the Okanagan Lake and Valley district, thence southward in Washington in the Cascade Range area as far at least as the

[29] We are sincerely indebted to our colleague Mr. E. R. Buckell, Entomologist-in-Charge, Field Crop Insect Laboratory of the Canadian Division of Entomology, at Kamloops, British Columbia, and the discoverer of *B. chilcotinae,* for an abstract of his capture records of and much other critical information on this form in British Columbia. We have made full use of these records in outlining the distribution here given.

vicinity of Stampede Pass [30] and to the eastward of these mountains into lower levels bordering the Columbia Plain at the southeastern end of Lake Chelan (Wapato Indian Reservation) and the vicinity of Ellensburg. At the latter locality it may have been taken at an appreciably higher elevation on the nearby Umptanum Ridge, but the label gives no details. This subspecies, and incidentally the genus, appears to be absent from the immediate Pacific coastal belt in both British Columbia and Washington, and apparently to the eastward in both of these political entities the subspecies, and also species, does not transgress on the ranges of *B. hispida* or *B. nuda.*

It is quite possible the subspecies may be found much more broadly distributed over the Cascades in Washington, particularly in their more southern portion, where on and near Mt. Rainier the species *chilcotinae* is represented by its alpine subspecies *c. tacoma.* However, as yet we have no information or material to support such a possibility, logical though it may be. Similarly we have no definite evidence of the intergradation of *B. c. chilcotinae* and *B. c. tacoma,* and subspecific rank is given the latter solely from the minor character of its distinguishing features.

In vertical distribution *B. c. chilcotinae* has a considerable range, or from under 1000 feet elevation (Oliver, in the Okanagan Valley, 950 feet, and Lillooet on the Fraser River, 676 feet [31]) in British Columbia, and as low as 1200 feet in the Lake Chelan region at the east foot of the Washington Cascades, to as high as 6000 feet [32] at Mt. McLaine, north of Lillooet, in British Columbia, and definitely to at least 6197 feet (Hart's Pass) in the Washington Cascades. From Slate Peak, Washington it is labelled as having been taken between 6500 and 7000 feet.

In Washington the distribution of *B. c. chilcotinae* seems to be almost as definitely limited on the eastward by the true Columbia plains as is that of *Prumnacris rainierensis,* and probably this is due to the same factor as that postulated by us as the control in the case

[30] See discussion on a preceding page of female Easton, Washington, specimen originally referred by Scudder to *Bradynotes expleta.*

[31] Ex Buckell in litt.

[32] The elevation given by Hebard (Trans. Amer. Entom. Soc., XLVIII, p. 61, (1922)) for Big Bar Mountain, i.e. 7400 feet, is an error. Although the specimens collected by him in 1921 are so labelled, Mr. Buckell now advises us that he collected these specimens near the summit at about 5000 feet.

of *Prumnacris,* i.e. Pleistocene Lake Lewis,[33] which covered much of these plains south of the Okanagan Valley.

In summarizing its distribution in British Columbia Mr. Buckell (in litt.) writes regarding *c. chilcotinae*: "It appears to occur from the valley floors to the open areas above timber-line." Zonally its range reaches from low areas of the Arid Transition Zone (Wapato Indian Reservation, Washington, and the Okanagan Lake and valley section of southern interior British Columbia) through the Canadian to at least strongly pronounced Hudsonian conditions, probably Arctic Alpine in British Columbia. In the Cascades section of Washington we know but little about its occurrence at levels between the extremes here given, i.e. the southeastern end of Lake Chelan (Wapato Indian Reservation) and the distinctly alpine habitat at Hart's Pass on the main ridge of the Cascade range at the head of the Methow Valley, north of and parallel to Lake Chelan.

Bionomics.—Buckell (in litt.) has summarized the habitat of this race in British Columbia by saying it "is a very common species on almost any warm brushy slope in the dry interior of the Province." In 1922 he published the following notes on it for the same region[34]: "This species is particularly fond of dry hill sides and mountain slopes covered with balsam-root (*Balsamorhiza sagittata* Nutt.[35]) and both nymphs and adults feed upon this plant. The nymphs begin hatching in early May, and the first adults appear during the first week in June. Oviposition takes place during July and by the end of August only a few adults can be found. The females are heavy insects and do not jump very actively, but the males are very active. The young nymphs are very soft and many fall prey to ground spiders and ants." As reported by Treherne and Buckell in 1924,[36] this form in 1920 and 1921 was exceedingly common in the Chilcotin district of British Columbia, where the type series was secured, and together with *Melanoplus bruneri* it "caused material damage to vegetation under

[33] Trans. Amer. Entom. Soc., LXX, p. 9, (1944).
[34] Proc. Entom. Soc. Brit. Col., no. 20, p. 29, (1922).
[35] Piper in his "Flora of the State of Washington" (Contr. U. S. Nat. Herbarium, XI, p. 580, (1906)) considers this species zonally to be Arid Transition.
[36] Bull. no. 39, new series, Dept. of Agr., Dom. of Canada, p. 26, (1924).

the poplar trees that fringe the edge of the open range." They continue: "Both species frequent situations that are partially shaded, being found in some numbers in the mountain meadows on the Riske Creek and adjoining ranges."

In Washington at the southeastern end of Lake Chelan (Wapato Indian Reservation) it was taken on sage-brush hills, and one individual is specifically labelled as taken on *Artemisia.* At Hart's Pass it was found in Hudsonian meadow conditions, with mixed plant cover and scattered low shrubs in the openings of fir forest, with numerous felled and wind-fallen decayed tree trunks scattered over the meadow. Notes made at the time of capture state it was "general but scarce and mostly in the more open places, some close to logs, among chips, while others were in tall brush vegetation. Males were very good jumpers, females more sluggish."

The material before us has as its earliest date for adults May 30 (Riske Creek [37] and Wapato Indian Reservation) and the latest August 29 (Nicola Lake). These dates apparently embrace the normal span of the adult life of the insects and support Buckell's statement quoted in a preceding paragraph.

It is evident from the habitat data now available that *B. c. chilcotinae* is an adaptable form, as much at home in meadowy spots in montane fir forests (Hart's Pass) as in sage-brush areas (Lake Chelan district). Whether it will be found in the more southern Cascade Mountains of Washington, below the alpine habitat of *B. c. tacoma,* remains to be determined.

As so often happens with locusts which occur in damaging abundance Treherne and Buckell [38] found adult specimens "with their body cavities containing dipterous larvae. In one instance five parasitic larvae were found within the thoracic cavity of a single female."

Specimens examined: 203; 119 ♂, 84 ♀.

British Columbia: Riske Creek, Chilcotin District; VI, 20, 1920, V, 30–VIII, 1, 1921; (E. R. Buckell); 86 ♂, 56 ♀ (*paratypes*): VI, 20, 1926; (E. R. Buckell); 5 ♂, 5 ♀; [A.N.S.P., Hebard Cln. and U.S.N.M.]. Big

[37] Hebard in error originally gave "IV, 18" as an occurrence date for adults of this species. The original material and his accompanying text show that "IV, 18" was an error for VI, 18.

[38] Bull. no. 39, new series, Dept. of Agr., Dom. of Canada, p. 26, (1924).

Bar [Mountain][39]; VII, 9, 1921; (E. R. Buckell); 2♂, 1♀; [Hebard Cln.]. Nicola; VIII, 1925; (E. R. Buckell); 1♀; [Hebard Cln.]. Nicola Lake; VII, 21, 27 and VIII, 29, 1922; (E. R. Buckell); 4♂, 2♀; [Hebard Cln. and U.S.N.M.]. Mt. Wahleach,[40] 5500 feet; VII, 30, 1923; (K. F. Audon); 1♀; [Hebard Cln.]. Aspen Grove; VII, 12, 13 and 14, 1922; (E. R. Buckell); 8♂, 8♀; [A.N.S.P., Hebard Cln. and U.S.N.M.]. Vernon, Okanagan Lake; VI, 18, 1924; (E. R. Buckell); 1♂, 1♀; [Hebard Cln.]. Kelowna, Okanagan Lake; VI, 18, 1927; (E. R. Buckell); 2♂; [A.N.S.P. and Hebard Cln.]. Oliver; VI, 4, 1924; (P. N. Vroom); 4♂, 2♀; [A.N.S.P. and Hebard Cln.].

WASHINGTON: Hart's Pass, Cascade Mountains, Whatcom-Okanogan Counties, elev. 6197 feet; VII, 30, 1941; (Rehn and Rehn); 6♂, 4♀; [A.N.S.P.]. Slate Peak, Okanogan County, elev. 6500–7000 feet; VIII, 2, 1940; 1♀; [U.S.N.M.].[41] Siwash, Wapato's Shore, Lake Chelan, elev. 1220 feet; V, 30, 1919; (A. C. Burrill; on *Artemisia* species); 1♂; [Hebard Cln.]. Wapato Indian Reservation, Lake Chelan; V, 30, 1919; (A. C. Burrill; on sage-brush foothills); 1♀; [Hebard Cln.]. Ellensburg [, Kittitas County]; 1♀; [Hebard Cln.].

Buckellacris chilcotinae tacoma[42] new subspecies
(Text-figs. 6 to 8, pl. I, fig. 23, pl. II, fig. 29.)

This alpine subspecies, as far as known at this time, is limited to certain areas on the slopes of Mount Rainier, and adjacent areas, Washington, at elevations slightly above six thousand feet and close to the timber-line. It differs from *B. chilcotinae chilcotinae,* of British Columbia and more northern portions of the Washington Cascades, in its average smaller size and in details of the furcula of the male, these having their forks more nearly contiguous and more trigonal and distad less attenuate in outline.

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[39] These specimens are so labelled and were quoted by Hebard as taken at "7400 feet." Mr. Buckell, who collected the specimens, assures me this is an error, and that he "collected the specimens near the summit at about 5000 feet."

[40] This label reads "Mt. Wahlaach," which I have been unable to locate, and Mr. Buckell has suggested that some mountain peak along along Wahleach Creek or near Wahleach Lake, which are in an area ten or more miles S.W. of Hope, near the Frazer River Canyon, was intended.

[41] Apparently this peak is near Slate Pass, which would seem to be an alternative name for Hart's Pass, listed above. Slate Pass is given in Landes' "Geographical Dictionary of Washington" (Bull. No. 17, Washington Geological Survey, 1917) as "a pass on the Cascade summit, at the head of Slate Creek (tributary of Ruby Creek), on the Whatcom-Okanogan line; elevation, 6,197 feet." This is the position and elevation of Hart's Pass, and the two are probably different names for the same pass.

[42] I.e. Tacoma, *the Indian name for Mt. Rainier.*

Type.—♂; Shadow Lake, near Yakima Park, Mount Rainier National Park, Washington. Elevation, 6300 to 6400 feet. August 2, 1941. (Rehn and Rehn.) [Academy of Natural Sciences of Philadelphia, Type no. 5698.]

From *B. chilcotinae chilcotinae* the present subspecies differs in the smaller and more contiguous character of the forks of the furcula of the male. The latter (see fig. 8) does not straddle the medio-longitudinal elevation of the supra-anal plate, as in *B. c. chilcotinae* (see fig. 3), but instead has its lobes much more closely placed, not separated by a considerable diastema of the margin of the furcula-bearing tergite, the lobes also being smaller proportionately, yet more definitely trigonal in outline and less attenuately submammillate distad than in *C. chilcotinae.*

Allotype.—♀; same data as type. [Academy of Natural Sciences of Philadelphia.]

Except for its slightly smaller size the female sex of *B. c. tacoma* shows no noteworthy differences from the same sex of *B. c. chilcotinae.*

Coloration.—The color pattern of this subspecies is the same as that of *B. c. chilcotinae* but less subdued, the paired dorsal longitudinal pale bars in the dorsum of the abdomen being much more clearly marked than in the mean of *B. c. chilcotinae,* and these are found present, but less conspicuously, in the female as well as in the male, while in *B. c. chilcotinae* they are much less frequently evident in the former sex. The range of color pattern and tone observed in *B. c. chilcotinae* has been discussed on a preceding page.[43]

Size variation.—The extremes in size found in the series of this subspecies show the following dimensions (in millimeters):

	Length of body	Length of pronotum	Length of caudal femur
♂, Shadow Lake, *paratype*	16.9	3.5	11
♂, Shadow Lake, *type*	18.7	3.9	11.4
♂, Shadow Lake, *paratype*	19.3	3.9	12.2
♂, Yakima Park, *paratype*	17.9	3.7	11.4
♂, Yakima Park, *paratype*	20	3.9	11.7
♀, Shadow Lake, *allotype*	25.5	4.5	13.2
♀, Shadow Lake, *paratype*	30.2	5.5	14.5
♀, Yakima Park, *paratype*	23.4	4.7	11.9
♀, Yakima Park, *paratype*	22.9[44]	4.5	13.2
♀, Sheep Lake	24	5.2	13.8
♀, Sheep Lake	24.3	4.7	14

[43] Hart's Pass, Washington, individuals of *c. chilcotinae* average as definitely bilineate in this respect in both sexes as in the material of *B. c. tacoma.* Canadian material of *c. chilcotinae,* however, has the pale bars usually but little prominent.

[44] Body somewhat contracted.

These measurements show there is an appreciable size range in material from a single population, each of the lots represented being from a very restricted area. In this size range we find the same plasticity in this respect evident in *B. c. chilcotinae*.

Morphological variation.—In *Buckellacris c. tacoma* is found the same variation in the relative stoutness or attenuation of the ovipositor valves in the female sex as is seen in *B. c. chilcotinae*. The degree of this variation is essentially the same as in the typical form of the species.

The furcula of the male is slightly variable in relative length, but the position and shape of the lobate arms, as well as the absence of any real diastema mesad between their bases, are fixed and definite characters. As in *B. c. chilcotinae* the relative breadth of the medio-longitudinal elevated section of the supra-anal plate of the male shows considerable individual plasticity, as well as the degree of concavity of the surface of the more distal portion of this central ridge. Rarely the surface of this same section may be deplanate and in no way concave.

Other features of individual variation here discussed under *B. c. chilcotinae* are similarly evident in *B. c. tacoma,* and to about the same degrees, as far as can be determined from the more limited series of the present subspecies.

Distribution.—We know *B. c. tacoma* from but three points, two of these limited areas on the northeastern shoulder of Mt. Rainier, Washington, i.e. Shadow Lake and Yakima Park, which are on the slopes of Sourdough Mountain above the head of White River where it issues from Emmons Glacier, and the third an unlocated point (Sheep Lake) in Yakima County to the eastward, apparently in the nearby Cascade range from the elevation given (6000 feet). At the two places on Mount Rainier it was taken at elevations of 6300 to 6400 feet. Probably this subspecies will be found in suitable environments at numerous localities of proper elevation in the Mount Rainier region and the Cascades immediately to the eastward of that great peak.

Nothing is known regarding the intergradation of this subspecies with *B. c. chilcotinae,* which is the form of the species occurring in the main Cascade range of northern and probably central Washington, and at lower elevations along or adjacent to the eastern foot of the Cascades at Lake Chelan and near Ellensburg.

Further information may show that *B. c. tacoma* is a form of the species limited to essentially alpine conditions in restricted parts of Washington, and that true *chilcotinae* is more broadly distributed at lower levels, as discussed under the latter form.

Bionomics.—All the specimens of this subspecies from Mount Rainier were taken August 2, 1941, and in addition to adults, both thoroughly hardened and teneral, these included both sexes in the instar preceding maturity. At Shadow Lake *c. tacoma* was taken on alpine slopes and in meadowy flats among subalpine firs (*Abies lasiocarpa*) and white-barked pines (*Pinus albicaulis*), on a surface largely made up of small pumice fragments, with a ground cover of low shrubs and flowering annuals of various colors. There the insect was local and usually found singly, the males more numerous than the females, immature individuals less frequent than the adults. At Yakima Park, a mile or so away, it was found on an open gentle slope, also largely composed of pumice fragments and sparsely covered with low grass and flowering annuals, with scattered clumps of firs. Both environments were characteristic of the belt where the Hudsonian Zone passes into the Arctic Alpine, the firs being Hudsonian, with the highest points of timber, i.e. the timber-line, but a few hundred feet higher on the ridges, while the open areas were descending tongues of Arctic Alpine.

In habits *B. c. tacoma* is more definitely ground inhabiting than *Prumnacris rainierensis,* which was found in the same general environment at Shadow Lake.

Specimens examined: 43; 22 ♂, 14 ♀, 1 immat. ♂, 6 immat. ♀.

WASHINGTON: Shadow Lake, near Yakima Park, Mt. Rainier National Park, 6300–6400 feet elev.; VIII, 2, 1941; (Rehn and Rehn); 9 ♂, 7 ♀ (*type, allotype* and *paratypes*), 1 immat. ♂, 6 immat. ♀; [A.N.S.P.]. Yakima Park, Mt. Rainier National Park, 6400 feet elev.; VIII, 2, 1941; (Rehn and Rehn); 13 ♂, 4 ♀ (*paratypes*); [A.N.S.P.]. Sheep Lake, Yakima County,[45] 6000 feet elev.; VIII, 5 and 6, 1940; (J. F. G. Clarke); 3 ♀; [U.S.N.M. and A.N.S.P.].

[45] We have not been able to place this locality in Yakima County, either on the U. S. Geological Survey topographic sheets, or in Landes' "Geographic Dictionary of Washington." The name is apparently a local one, but doubtless, from the elevation, the lake in question is situated relatively high up in the main Cascades, or on one of the principal lateral spurs, and a short distance eastward of Mount Rainier.

Buckellacris hispida (Bruner)

(Text-figs. 9 to 12 and 17, pl. I, figs. 24 and 27, pl. II, figs. 30 and 33.)

1885. *Pezotettix hispidus* Bruner, Canad. Entom., XVII, p. 12. [♂, ♀; Colville, W[ashington] (Territory).]

1897. *Bradynotes hispida* Scudder, Proc. U. S. Nat. Mus., XX, p. 81, pl. VI, fig. 5. [♂, ♀ (original material); Colville Valley, eastern Washington.]

1898. *Asemoplus nudus* E. M. Walker, Canad. Entom., XXX, p. 197. (In part.) [♂, ♀; Sandon, "Gold Range," British Columbia (only).]

1919. *A[semoplus] hispidus* Hebard, Trans. Amer. Entom. Soc., XLV, p. 272.

Type.—♂ [46]; Brown's,[47] Colville V[alley], Washington. July 24, 1882. (Hagen and Henshaw.) [Hebard Collection, ex Bruner.]

Our understanding of the species is drawn from the previously selected single type and a female from the type lot, here selected as the allotype, both before us in the Hebard Collection ex Bruner. We also have before us two males and one female from Sandon, British Columbia, originally referred to *Asemoplus nudus* by E. M. Walker, and which, as already pointed out by Hebard, are clearly *hispida.*

The position of *hispida* is somewhat nearer *nuda* than *chilcotinae,* but in some respects it is an annectant type. The general build, fastigial details, the pronotal proportions and general sculpture are appreciably closer to what we see in *nuda,* which is also true of the general shape and of the sculpture of the male supra-anal plate, while the lateral borders of the same are furnished in the middle with a pronounced inner shoulder, this being absent, or at least obsolete, in both *chilcotinae* and *nuda.* The angle of the apex of the supra-anal plate of the male is blunter than in *nuda,*[48] and the cephalic and median femora of the three males of

[46] Selected as single type by Rehn and Hebard, Proc. Acad. Nat. Sci. Phila., 1912, p. 127, (1912). The specimen bears a label, in Bruner's handwriting, reading "Pezotettix hispidus Bruner, Type."

[47] This exact locality is given by the labels on the type and allotype. There is a Brown's Lake at the head of Woodberry Creek, a tributary of Huckleberry Creek, which latter enters the Colville River on the valley floor about one mile north of the town of Valley. The elevation there is approximately 2000 feet. See Chewelah, Washington, Quadrangle of the topographic maps of the United States Geological Survey.

[48] The lectotype male of *hispida* has the immediate apex of the plate V-emarginate, apparently due to an early injury which had healed. Scudder's figure of this, to him unique, male specimen has this portion of the plate restored as Scudder or the artist thought it should be in an uninjured individual. Males now before us show the plate as drawn has the margin correctly represented.

hispida before us are appreciably less inflated than in the same sex of either *chilcotinae* or *nuda*. The greatly reduced and widely separated node-like remnants of the furcula of the male of *hispida* are quite distinctive, and have been well figured by Scudder.

Scudder's description of *hispida,* to which reference is given above, presents the salient features of the species when checked with the type and allotype now before us. A few of the characters which he stressed are essentially generic when contrasted with those of other units of the same rank, such as the sparsely pilose body.

The species has been infrequently collected, and we have before us but six specimens, including the type and allotype. Bruner did not specify the size of the original representation, but we can assume that all of this lot was examined by Scudder for his 1897 study. The latter listed one male and three females from Bruner's original lot, and of these the male and one of the females are now before us.

Measurements (in millimeters)

	Length of body	Length of pronotum	Length of caudal femur
♂, Sandon, British Columbia, *paratype* of *Asemoplus nudus*	19.9	3.7	10.4
♂, Sandon, British Columbia, *paratype* of *Asemoplus nudus*	18.4	3.5	9.7
♂, Colville Valley, Washington, *type*[49].	22.3[50]	3.9	12
♀, Sandon, British Columbia, *paratype* of *Asemoplus nudus*	29.1[51]	4.5	11.9
♀, "Gold Range Valley," near Sandon, British Columbia	24.4	4.2	11.6
♀, Colville Valley, Washington, *allotype*[52]	23.4	4.4	12.5

[49] Bruner originally gave the following measurements for the male sex: body, 18.5; pronotum, 3.3; caudal femur, 11. Scudder gave: body, 18.5; pronotum, 3.6; caudal femur, 10.7. Bruner's measurements probably, and Scudder's undoubtedly, were taken from the specimen measured above.

[50] The apex of the abdomen recently has been extended unnaturally to evert the internal genitalia.

[51] Abdomen somewhat abnormally extended.

[52] Bruner gave for the female sex: body, 21; pronotum, 4; caudal femur, 11.5. Scudder gave: body, 21; pronotum, 4.5; caudal femur, 12.5. We have no assurance that either of the previous authors measured the particular specimen which has been selected as the allotype.

Morphological variation.—The Colville Valley, Washington male type has, as the above measurements show, proportionately more elongate caudal femora, which are also relatively slender. The allotype, also from Colville Valley, shows the same tendency, but to a less pronounced degree. This is probably a regional fluctuation, but the available series is hardly extensive enough to warrant any deductions, other than that an essentially similar regional correlation is evident in *B. nuda relicta,* from Tin Cup Divide, southeastern Idaho. In the latter case, however, other features of differentiation are also present.

The number of spines on the external extensor margin of the caudal tibiae varies in the present material of *hispida* from seven to eleven, the latter present only on one limb in the allotypic female, which also is anomalous in having one of these spines occupying a definitely apical position, an entirely adventitious feature in this group. One Sandon female has but seven spines in this margin of each caudal limb, while a male from the same place has nine on each, and another of that sex eight on one limb and ten on the other. Nine is the average number, being found on at least one margin in four of the six specimens examined.

Coloration.—The relatively contrasted coloration of *hispida,* which in both sexes is very similar to that of *nuda,* has already been described by Bruner and also by Scudder. The Colville Valley, Washington, type and allotype show cloud-like transverse dark bars dorsad on the caudal femora, but these are not evident in the British Columbian material of both sexes now before us. This tendency appears to be quite independent of the general pattern contrast, and probably is regional in emphasis.

Distribution.—The range of *Buckellacris hispida* appears to be relatively limited, extending, as far as at present known, from Colville Valley, northeastern Washington, north to Sandon, British Columbia, which is between Slocan and Kootenay Lakes. These localities would indicate that the species is an inhabitant of trough or intermontane valleys in the Selkirk Mountains area of British Columbia and Washington. Apparently, *hispida* prefers relatively low elevations. The whole of Colville Valley, Washington, is somewhat under 2000 feet elevation—Brown's Lake is very slightly higher. At Sandon *hispida* was taken at 2600 feet, according to

Walker, although one of his specimens from that locality, now before us, is labelled 2480 feet. The known vertical range is thus from approximately 2000 to 2600 feet. Thus *hispida* prefers definitely lower levels than *B. nuda,* and while the ranges of the two are known to impinge narrowly, they occur at different elevations.

Bionomics.—The little known on the habits and occurrence period of *B. hispida* is that it was taken "on the grassy path of a snowslide" at Sandon, September 16, while the type and allotype were secured in Colville Valley on July 24. The additional female before us was taken August 17.

Specimens examined: 6; 3 ♂, 3 ♀.

BRITISH COLUMBIA: Sandon,[53] elevation 2480 feet (on one specimen); IX, 16, 1897; (E. M. Walker); 2 ♂, 1 ♀ (*paratypes* of *Asemoplus nudus* E. M. Walker); [E. M. Walker Cln.]. "Gold Range" [54] Valley near Sandon; VIII, 17, 1908; 1 ♀; [Hebard Cln.].

WASHINGTON: Brown's, Colville Valley; [Hagen and Henshaw]; VII, 24, 1882; 1 ♂ (*type*), 1 ♀ (*allotype*); [Hebard Cln. ex Bruner].

Buckellacris nuda (E. M. Walker)

This species has as its components two subspecies, which are here treated individually. The distribution of the species as a whole is the aggregate of the ranges of the subspecies.

Buckellacris nuda relicta [55] new subspecies (Text-figs. 14 and 21.)

This quite isolated subspecies of *nuda* is here placed before *nuda nuda* as in a systematic arrangement it shows closer approximation toward *B. hispida* than does *B. n. nuda,* even though geographically it is more widely removed. As far as present information goes *B. n. relicta* is found only in southeastern Idaho.

As shown in the key to the forms of the genus, *B. n. relicta* is distinguished from *B. n. nuda* of more northern distribution by having proportionately longer and more slender caudal femora,

[53] Sandon lies between Kootenay Lake and Slocan Lake, about 13 miles N.W. by W. of Kaslo on Kootenay Lake. Peaks of the Selkirk range rise north and south of the transverse valley in which Sandon is situated.

[54] The Gold Range, on most reliable charts, is given as the name of the range flanking on the west the Columbia Valley in its Arrow Lake section. This uplift is also known as the Monashee Mountains. The range east of the Columbia Valley in that portion of British Columbia is usually called the Selkirks, and Sandon is in that area. Mr. Buckell has kindly verified this interpretation of the term Gold Range.

[55] I.e. *that which is left,* in allusion to its apparently early isolation.

more elongate antennae and a relatively narrower, less inflated head, with the genae appreciably less prominent than in *B. n. nuda,* this latter condition more evident in the female than in the male. In coloration the quite limited series of *B. n. relicta* now before us is richer and more rufescent in base tone than the average of *B. n. nuda,* but this may be due to purely environmental conditions and thus not characteristic of the subspecies. The acquisition of additional material alone will supply definite information on this point.

Type.—♂; Tin Cup Divide,[56] Caribou Range, Caribou County, Idaho. June 23, 1937. (C. Wakeland.) [Hebard Collection, Type no. 1368.]

Compared with typical males of *B. n. nuda* from the Laggan and Banff, Alberta, area the general build and form is seen to be very similar, but the following differences are apparent. Antennae definitely more elongate, equal to nearly 1⅜ times the combined length of the head and pronotoum, instead of usually less than 1⅖ times the same dimension as in *B. n. nuda.* Cephalic and median femora slightly longer and less bullately inflated than in *B. n. nuda.* Caudal femora definitely more slender and longer in proportion to the body and in more restricted ratio to the combined length of the head and pronotum; femoral depth to length as 14 to 70, or depth contained five times in length, as against a range of from 15–16 to 60–65, or depth contained 3¾ to 4¼ in femoral length in *B. n. nuda.* This attenuation of the caudal limbs also is reflected in the caudal tibiae, which are similarly somewhat more attenuate than in *B. n. nuda.* External genitalia of the male sex as in *B. n. nuda.*

Allotype.—♀; same data as type. [Hebard Collection.]

When compared with typical females of *B. n. nuda,* showing the following noteworthy differences. Antennae more elongate, equal to slightly more than 1⅓ times the combined length of the head and pronotum, instead of from 1⅒ to 1¼ times the same dimension as in *B. n. nuda* females. In cephalic aspect the head is appreciably narrower and with the genae less inflated than in *B. n. nuda,* the width across them being as 11 to a head depth of

[56] Apparently "Tin Cup Divide" is the ridge of the Caribou Mountains above the upper waters of Tin Cup River, which flows in a general northeastward direction into Salt River, and this in turn reaches the South Fork of the Snake River. The elevation at which the typical material was taken is probably somewhere between 6750 feet, the lowest point charted on this divide, and 8000 feet, which is reached and somewhat surpassed by the high points of the ridge. See Freedom (Idaho-Wyoming) Quadrangle of the U. S. Geological Survey topographic sheets.

16, with a breadth of 10 across the eyes, while Banff, Laggan and Blairmore, Alberta females show ratios of 12.5 across genae to a head depth of 16, and an ocular width of 11. Caudal femora appreciably shallower, more slender and elongate in proportion to other dimensions, the depth to length being as 16 to 75, or depth contained almost 4 7/10 times in length, as against a range of from 16–20 to 65–85, or depth contained 3 8/10 to 4 1/4 in femoral length in *B. n. nuda.*

Coloration.—The color pattern is as in *B. n. nuda,* with the longitudinal paired pale dorsal bars pronounced, the dark caudal femoral bars variable in emphasis, more decided, although incomplete, in the females than in the average of *B. n. nuda,* subobsolete in the single male seen. The pale general base color is quite definitely tinted with coral red to pompeian red, particularly on the caudal femora. In one of the females the latter are strongly suffused with blackish laterad on the distal 3/4 of their length.

Measurements (in millimeters)

	Length of body	Length of pronotum	Length of caudal femur
Tin Cup Divide, Idaho.			
♂, *type*	18.7	3.9	11.4
♀, *allotype*	22.8	4	12.2
♀, *paratype*	24.4	3.9	12.5
♀, *paratype*	23.6	4	12

Morphological Notes.—The available series of this new form is too limited to draw any broad conclusions as to its possible variation. The antennae and caudal femora of the four specimens before us show the following grating ratios (and their metric equivalents) when compared with same for the combined length of head and pronotum:

♂ (*type*); antennae, 60 (9.78 mm.); head and pronotum, 38 (6.19 mm.); caudal femur, 70 (11.41 mm.).

♀ (*allotype*); antennae, 56 (9.12 mm.); head and pronotum, 41 (6.68 mm.); caudal femur, 75 (12.22 mm.).

♀ (*paratype*); antennae, 50 (8.15 mm.) [old injury at apex ?]; head and pronotum, 40 (6.52 mm.); caudal femur, 71 (11.57 mm.).

♀ (*paratype*); antennae, 54 (8.80 mm.); head and pronotum, 42 (6.84 mm.); caudal femur, 74 (12.06 mm.).

Distribution.—We know this subspecies only from the type locality, which is over three hundred miles in an air-line south of the nearest point at which, at this writing, *B. n. nuda* is known to occur. What form of *B. nuda,* if any, will be found to occur in suitable environments in the intervening mountain masses—the Tetons and the southern and central Bitter Roots—remains to be determined.

Remarks.—Although a number of entomologists have visited and actively collected in the Yellowstone and Grand Teton National Parks, none, to our knowledge, has there encountered this genus. The same is also true of the Bitter Root Mountains, although we know less regarding the Orthoptera of that range than we do that of the Yellowstone and Teton areas. If the connection of this at present isolated form with the more widely spread *B. n. nuda* to the northward, was not by way of a Bitter Root-Teton avenue, it must have been directly north or northwestward over the floor of the Snake River Plain. This latter is made up of vast areas of Pliocene acid lavas, overlaid by much fresher Pleistocene or Recent basaltic lava flows. Conceivably this may have been crossed by flightless insects over the then relatively old and weathered lava during a Pleistocene period free from volcanic activity, but if so this must have been definitely prior to the deposition of the great basalt flows, which then and now would definitely nullify the passage of this area by a form such as *Buckellacris.* It is probable, regardless of whether it entered its present locale by way of the Bitter Roots and Tetons, or by crossing the Snake River Plain, that *B. n. relicta* was established in its present home during a relatively early glacial period, left there by the ancestral *nuda* stock, the remainder of which, after the vicissitudes of subsequent glacial and interglacial stages, finally drew northward after the waning of the Wisconsin ice sheet, and reached its present home in the more northern Rockies.

Specimens examined: 4; 1 ♂, 3 ♀.

IDAHO: Tin Cup Divide, Caribou County; VI, 23, 1937; (C. Wakeland); 1 ♂ (*type*), 3 ♀ (*allotype* and *paratypes*); [Hebard Cln.].

Buckellacris nuda nuda (E. M. Walker)

(Text-figs. 13 and 18 to 20, pl. I, figs. 25 and 26, pl. II, figs. 31 and 32.)

1898. *Asemoplus nudus* E. M. Walker, Canad. Entom., XXX, p. 197, pl. 6, figs. A–D. (In part.) [♂, ♀; Mt. St. Piran, near Laggan, Alberta.]

1904. *Podisma polita* Caudell (not of Scudder, 1899), Entom. News, XV, p. 63. [♀; Kitchener Glacier, Mt. Kokanee, British Columbia.]

1907. *Asemoplus nudus* Caudell, Proc. Entom. Soc. Wash., VIII, p. 134. [♂, ♀; Paradise Valley, Mt. Rainier, Washington.]

1919. *Asemoplus somesi* Hebard, Trans. Amer. Entom. Soc., XLV, p. 271, pl. XXIX, figs. 8 and 9. [♂ (*type*), ♀; Upper Little St. Mary Lake, above Lake Ellen Wilson, Glacier National Park, Montana (type locality); Banff, Alberta; Lake Louise and Kitchener Glacier on Mount Kokanee, British Columbia; Wallace, Idaho; Paradise Valley, Mt. Rainier, Washington.]

The history of this specific (and subspecific) name is much involved and must be analyzed for clear understanding. As Hebard explained in 1919,[57] when describing *Asemoplus somesi,* Walker's original series was composite and his name covered two species, the Sandon, British Columbia, material representing *B. hispida* as here understood, while the Mt. St. Piran series, from the Canadian Rockies, belonged to the species which Hebard then described as *somesi.* While Hebard states he examined all of Walker's original material, and synonymized *nudus* under *hispidus,* he failed to indicate any single type for *nudus,* and in the absence of such a selection he thus left open, for future judgment, any decision as to which of the two species formed the principal basis of Walker's *nudus.* Walker's description holds little of decisive character, but this little is important. He states: "Furcula consisting of a pair of minute rounded tubercles. In one specimen, which is the one figured, it is quite distinct and much better developed than in the others, in which it is almost obsolete." It so happens this is one of the obvious differences between *hispida* and the species called *Asemoplus somesi* by Hebard, and the emphasis placed upon the figured male prevents any logical conclusion other than that the sole figured male (figs. B, C and D) should be regarded as the single type. This specimen is clearly the Mt. St. Piran male and the same as the subsequently described *somesi.*

In line with these conclusions the figured male and female from Mt. St. Piran, near Laggan, Alberta, in the E. M. Walker Collec-

[57] Trans. Amer. Entom. Soc., XLV, p. 271, footnote 25.

tion at the University of Toronto, are here selected as the single type (male) and allotype of *Asemoplus nudus,* and we must consider *somesi* Hebard a synonym of restricted *n. nuda.* This is in conformity with the doctrine that in the limitation of a composite species to one of the components, the name should be retained for that which, at the time of such limitation, was undescribed, and also the added limitation of a name to a component which was figured by the original author. On both counts no course is open but to limit *nuda* to the species (and subspecies) subsequently described as *Asemoplus somesi* Hebard.

Figures B and D of the male of *nuda* given by Walker present the more obvious features of the external genitalia of this species, as contrasted with those of the same parts in *hispida.* The character of the furcula and the sculpture of the supra-anal plate are fully conclusive.

Morphological variation.—In *Buckellacris nuda nuda* we find most of the same features of individual structural variation noted under *B. c. chilcotinae.* General body bulk, apart from size, shows the same tendencies toward more robust or slimmer forms, quite evident in the longer series from Logan Pass and Upper Little St. Mary Valley, Glacier National Park, and Haugan, Montana. While most evident in the male sex, this variation is also seen in the female. Individual variation in the breadth of the dorsal interocular space, the general outline of the fastigium as seen in dorsal view, and the amount and extent of the excavation of the fastigial disk show a relatively broad range, particularly striking in series from single localities, and not limited to one sex, although slightly more decided in the male. The dorsal portion of the frontal costa also varies individually in breadth, and in both sexes, and is not necessarily correlated with proportionate body breadth.

In the male sex there is a definite amount of variation in the extent to which the distal extremity of the dorsal margin of the subgenital plate is developed mesad into a pair of low submammillate tubercles. This tendency may range from well indicated to obsolete, and even in series as limited as ten males from Logan Pass, seven from Upper Little St. Mary Valley and eleven from Haugan, Montana. Very rarely (one from Banff and another

from Haugan) this extremity of the plate is subacutely produced into a sharp spout-like marginal structure, while in all other males seen this area, as viewed from the dorsum, is narrowly rounded or subtruncate, if not bimammillate. The furcula of the male is always a well developed pair of trigonal to subtrigonal lobes, somewhat variable in relative length and breadth, closely placed and but narrowly separated. The apex of the male supra-anal plate varies quite appreciably in the degree of its obtuse-angulation.

The ovipositor jaws of the female show the same amount of individual variation in robustness and relative attenuation noted in *B. c. chilcotinae,* and the extremes, with intermediate stages, are present in each of the series of females from Logan Pass, Upper Little St. Mary Valley and Haugan.

The variation in ratio of depth to length of the caudal femora found in *B. n. nuda* is discussed on a preceding page, in a comparison with the proportions of the same part of the limbs in *B. n. relicta.*

Measurements (in millimeters)

	Length of body	Length of pronotum	Length of caudal femur
♂, Invermere, British Columbia	15.4	3.2	8.9
♂, Invermere, British Columbia	15	3.4	8.8
♂, Banff, Alberta	19.5	3.4	9.8
♂, Bertha Lake, Alberta	17.7	3.2	9.3
♂, Waterton, Alberta	18	3.5	10.4
♂, Wallace, Idaho	20.3	3.5	10.2
♂, Avalanche Lake, Glacier Nat. Park, Mont.	18.5	3.5	10.1
♂, Logan Pass, Glacier Nat. Park, Montana	16.3	3.4	9.6
♂, Logan Pass, Glacier Nat. Park, Montana	17.4	3.5	10.4
♂♂, Upper Little St. Mary Valley, Glacier Nat. Park, Mont. Range of paratypes of *A. somesi,* ex Hebard	15[68]–18.5	3.3	9.4–10.2
♂, Haugan, Montana	16.1	3.2	9.1
♂, Haugan, Montana	18.4	3.4	10.4
♂, Swan Range, Montana	17.6	3.5	9.7
♂, Mt. Rainier, Washington	17.1	3	8.4
♂, Mt. Rainier, Washington	16.7	3.4	8.9
♂, Paradise Park, Mt. Rainier, Washington	18.5	3.5	9.4

	Length of body	Length of pronotum	Length of caudal femur
♀, Mt. Kokanee, British Columbia....	18.5[58]	3.9	11.2
♀, Invermere, British Columbia.....	21.2	3.7	11
♀, Invermere, British Columbia.....	22.2	3.5	11.4
♀, Mt. St. Piran, Laggan, Alberta, *paratype*.....	24.4	3.7	10.6
♀, Mt. St. Piran, Laggan, Alberta, *allotype*.....	24.6	4	11.2
♀, Lake Louise, Alberta.....	23.6	4	11.5
♀, Banff, Alberta.....	26.9	4.4	11.5
♀, Blairmore, Alberta.....	24.6	4.2	11.7
♀, Blairmore, Alberta.....	29.3	4.8	13.6
♀, Avalanche Lake, Glacier Nat. Park, Montana.....	25.1	3.7	12.3
♀, Logan Pass, Glacier Nat. Park, Montana.....	25.7	4	11.7
♀, Lake Ellen Wilson, Glacier Nat. Park, Montana.....	20.9	4.2	12.2
♀♀, Upper Little St. Mary Valley, Glacier Nat. Park, Montana. Range of paratypes of *A. somesi*, ex Hebard	19–23	3.9–4.1	11.2–12.3
♀, Haugan, Montana.....	22.4	3.9	12.2
♀, Haugan, Montana.....	25.2	4.5	12.8
♀, Swan Range, Montana.....	22.8	4.5	11.7
♀, Swan Range, Montana.....	23.8	4.7	12.5
♀, Mt. Rainier, Washington.....	23.4	3.9	11
♀, Mt. Rainier, Washington.....	28[59]	4.2	11.2
♀, Paradise Park, Mt. Rainier, Washington.....	26.8	3.9	10.9

It is evident from the above measurements that, as in *B. c. chilcotinae,* the smallest individuals are almost always those taken in the more rigorous environments and under more truly alpine conditions (Mt. Kokanee, Mt. Piran, Logan Pass, Lake Louise and Mt. Rainier). Conversely those of largest size are from habitats apparently less severe, and generally, but not invariably, from the lowest elevations at which the species has been taken (Blairmore, Waterton, Haugan and Wallace). Aside from this broad correlation it is evident that a considerable individual size range is also found in the larger representations examined, such as those from Upper Little St. Mary Valley, Logan Pass and Haugan.

[58] Abdomen shrunken.
[59] Abdomen somewhat extended.

Coloration.—Hebard's description of the coloration of the synonymic *Asemoplus somesi*[60] gives the chief features of the coloration of this species, and also comments on the individual variation noted in the same. Each locality represented by a fair series shows some localized tendencies in coloration quite apart from the fluctuation produced by the areal extent of the dark pattern. The emphasis of the paired pale longitudinal dorso-lateral bars is tied in to the strength of the dark pattern, being little evident in those heavily suffused with blackish olivaceous, or even dull olivaceous, and most evident in those with the medio-longitudinal dark area much restricted in width. Almost all the available females from Canadian Cordilleran localities and those from Mt. Rainier, Washington, have the dorsal surface definitely true olivaceous of varying shade without a medio-longitudinal dark section. This condition is seen only occasionally in other series.

As a whole, as Hebard has pointed out, and as is true of many apterous or brachypterous melanoploids, the females are less brilliantly colored than the males, although some of the Haugan females are almost as contrasted as the average male. The darker caudal femoral bars mentioned by Hebard are lacking in numerous specimens of both sexes, and strongly indicated in relatively few. The caudal tibiae range in general tone from honey yellow to wax yellow, very rarely as dull as clay color.

Distribution.—From the present known range of *B. n. nuda* it is evident that it has a discontinuous distribution, and that which we see to-day explains what undoubtedly took place in its history in the recent past.

Available records outline the distribution of *B. n. nuda* as reaching as far north on the Alberta-British Columbia Cordilleran boundary as the vicinity of the Kicking Horse Pass (i.e. Laggan, Banff, Lake Louise and Field) and the upper course of the Columbia River at Invermere, British Columbia, with a colony known from Mt. Kokanee in the Slocan Group of the Selkirk Mountains of southeast-central British Columbia, thence extending southward in the Cordilleran region to as far as Wallace, Idaho, Haugan, Montana, on the eastern side of the Bitter Root Mountains, and the Swan Range in the same state, east of Flathead Lake. The

[60] Trans. Amer. Entom. Soc., XLV, p. 274, (1919).

subspecies is, as far as known, entirely absent from British Columbia west of Mt. Kokanee (Selkirks) and in Washington it has been found only as an isolated colony on Mt. Rainier in the Cascade region. It is hardly possible to estimate to what extent further collecting will broaden the known distribution, but the fact that extensive field work has been carried on, and trained orthopterists have made special studies, in numerous sections of British Columbia and Washington in which *B. n. nuda* has not as yet been taken, naturally leads to the conclusion that it is absent. It is interesting to note that while the authors have both collected at timber-line on Mt. Rainier, and the senior author did so on two occasions over thirty years apart, no one but Dyar and Caudell have taken *B. n. nuda* there, although *B. chilcotinae tacoma* was secured by us in the same general environment.

In altitudinal distribution this form has a considerable range, perhaps even equalling that of *B. chilcotinae chilcotinae.* However, this range is over the whole distribution of the subspecies, and at any single locality its vertical range apparently is quite limited. In several cases the specimens examined probably came from environments more boreal, or even alpine, than the localities with which they are labelled, the latter doubtless being the names of the nearest communities (i.e. Wallace,[61] Idaho, and Haugan,[62] Montana). In consequence we do not feel these localities furnish a true index of the altitudinal distribution, and in that respect are here disregarded. The localities for which we have exact elevations in the Canadian portion of the range of *B. n. nuda* reach from as high as 9000 feet (Kitchener Glacier on Mt. Kokanee), this being considerably above the timber-line, and 7100 feet on Mt. St. Piran, to as low as 4075 feet at Field and 2625 feet at Invermere, British Columbia. In Glacier National Park, Montana, it has been taken as high as 6800 feet (Lake Ellen Wilson) and as low as 4400 feet near Avalanche Lake. In the Swan Range, Montana, it was secured at 7600 feet, and in Paradise

[61] The mountains encircling Wallace rise as high as 5500 to 6000 feet, although the town has an elevation of but 2733 feet.

[62] The railroad station of Haugan is 3150 feet elevation, although the Bitterroot Mountains immediately to the south and southwest go up to from 6300 to 7300 feet within six miles of Haugan, one foothill spur within two miles reaching 5100, and to the north peaks of the Coeur d'Alene Mountains, not over five miles away, reach as high as 6000 feet.

Park, Mt. Rainier, in all probability, at some point between 5000 and 6000 feet, which are the approximately lower and upper limits of that alpine valley.

Zonally, the form is chiefly, if not entirely, Hudsonian and Arctic Alpine. Whether it actually infiltrates into Canadian Zone territory remains to be determined and is intimated only by certain of the lower elevations given above. It is possible, however, that slope exposure may be responsible in those immediate environments for the dropping of Hudsonian conditions lower than their more usual levels at those latitudes.

Bionomics.—The available information on the dates of occurrence of *B. n. nuda* shows its presence in the adult condition as early as July 5, and as far north as Lake Louise, Alberta, while the latest date regarding which we have information is September 19, on Mt. St. Piran, at Laggan, in the same immediate area. To the southward it has been taken as early as July 31, in the Swan Range, Montana, and as late as September 8, at Haugan, Montana. The presence of individuals in the instar preceding maturity on August 9, in the Upper Little St. Mary Valley, shows the species there becomes adult not long prior to that date.

On Mt. St. Piran, Alberta, it was taken above the timber-line; in Upper Little St. Mary Valley, Glacier National Park, it was very numerous on coarse herbage among the rocks at or above the timber-line, occurring "in isolated spots of similar ecological conditions." In Paradise Valley on Mt. Rainier, Washington, Caudell found it occurring in about equal numbers with *Prumnacris rainierensis* in alpine herbage.[63] At Lake Bertha, Alberta, it was reported by Hebard from high alpine grasses.

It is apparent from the available information, and also the absence of the species from collections made in numerous sections of the area embraced within its distributional limits, that it is definitely local, although perhaps, as is true of *Prumnacris,* quite abundant in favored spots.

[63] This was in 1906. In 1910 in the same immediate area Rehn and Hebard found *Prumnacris* exceptionally abundant but no trace of *Buckellacris nuda.* In 1941 in similar environments on the north side of Mt. Rainier, we found *Prumnacris* locally numerous and *Buckellacris chilcotinae tacoma* also present, but no evidence of *B. nuda.*

Remarks.—The present distribution of the species *Buckellacris nuda* shows conclusively that it has had a rather checkered history, and that the discontinuous pattern we see to-day is the result of Pleistocene movements forced by glacial conditions. At least two such movements seem required to account for this pattern, one, which carried *B. n. relicta* to southeastern Idaho, definitely earlier than the other, the evidence for which latter is the undifferentiated character of the relict colony of *n. nuda* in Hudsonian Zone conditions on Mt. Rainier. From these definite pieces of evidence we can postulate an early, perhaps mid-Pleistocene, rather broad distribution of *nuda* southward, followed by a recession northward, which left *B. n. relicta* (or more properly that from which the present *relicta* has been developed) stranded on the Caribou Mountains, and perhaps elsewhere in the same general area. A warm interglacial stage was probably responsible for this abandonment of outposts. The second southward invasion was clearly more recent, if we are to regard relative differentiation, or the lack of it, as a factor in appraising elapsed time. The present apparent isolation of the Mt. Rainier colony is doubtless due to the same unknown factors which removed *nuda* otherwise from the picture in all of Washington and most of British Columbia west of its present known range in the eastern half of the province.

An effort to interpret these movements in the light of our present knowledge of the age of the several glaciations of the area covered has been quite interesting. We have drawn largely upon the information, maps and papers listed in the relevant bibliography assembled by Antevs in his classic "Maps of the Pleistocene Glaciations." [64] Regardless of just when in Pleistocene times the *nuda* stock was pushed southward far enough to permanently establish it, a matter discussed more fully in the preceding generic analysis, it is quite possible the isolation of *B. n. relicta* was accomplished in Yarmouth Interglacial times. It is equally possible, and in fact probable, that the factor which isolated the undifferentiated Mt. Rainier colony of *B. n. nuda* was the Wisconsin glaciation, no matter where this remnant may have survived that period, and that in Post-glacial times, with Lake Lewis covering much of the Co-

[64] Bull. Geol. Soc. Amer., XL, pp. 631–720, (1929).

lumbia plains, the Coulee region for at least a considerable period threaded by glacial streams, and other areas of the emerging land little suited for the species, the Mt. Rainier stock has survived in one of the limited areas to its liking. It is possible that the Wisconsin ice extinguished the *nuda* stock over large areas where, from present evidence, it must have occurred previously. The present Selkirk and Cordilleran stocks of *B. n. nuda* probably survived the Wisconsin by moving southward into areas of western Montana and northern Idaho which are known to have been free of Wisconsin ice. Also, according to Salisbury,[65] the valley glaciers in the mountains of northwestern Montana had retreated before the great Piedmont sheet of the Wisconsin to the northeast reached its most advanced position, the drift of the latter overlying that of the former at various points in that section of Montana. With species such as *nuda,* inured as they are to life near the borders of existing glaciers, survival would be possible in many areas uninhabitable for species not so constituted. Low summer temperatures alone would be of less importance as a control than generally believed, from what we know of the present-day habitats of the species. Ice and flooding were clearly the removing factors, and these seem to have been responsible for the isolation of the Mt. Rainier stock.

Specimens examined: 173; 76 ♂, 94 ♀, 1 juv. ♂, 2 juv. ♀.

ALBERTA: [Mount St. Piran,] Laggan, elevation 7000–8000 feet; IX, 19, 1897; 4 ♂ (*paratypes*); [E. M. Walker Cln., and U.S.N.M.]. Laggan; IX, 5, 1925; (Owen Bryant); 1 ♀; [U.S.N.M.]. Lake Agnes, Laggan, elevation 6800 feet; VII, 10, 1925; (Owen Bryant); 1 ♀; [U.S.N.M.]. Lake Louise; VII, 5; (Mrs. Charles Schäffer); 1 ♀; [A.N.S.P.].[66] Banff; VIII, 25, 1925; 1 ♂, 1 ♀; [Hebard Cln.]: VII, 23, 1925; (Owen Bryant); 1 ♀; [U.S.N.M.]: VIII, 9 and 25, 1925; (E. R. Buckell); 5 ♂, 2 ♀; [Canad. Dept. of Agr.]. Cascade Mtn., Banff, elevation 7000–8000 feet; VIII, 8–13, 1925; (Owen Bryant); 6 ♂, 5 ♀; [U.S.N.M.]. Summit of Sulphur Mountain, Banff, elevation 7000–7400 feet; VI, 26, 1925; (Owen Bryant); 1 juv. ♂; [U.S.N.M.]. Norquay Mountain Meadows, Banff, elevation 5000–6000 feet; VII, 4, 1925; (Owen Bryant); 1 ♂; [U.S.N.M.]. Blairmore; VIII, 26 and 27, 1926; (N. Criddle); 3 ♀; [Hebard Cln.].[67] Waterton;

[65] Journal of Geology, IX, pp. 719–720, (1901).

[66] Recorded by Hebard (Trans. Amer. Entom. Soc., XLV, p. 275, (1919)) as *Asemoplus somesi.*

[67] Recorded by Hebard (Proc. Acad. Nat. Sci. Phila., LXXXII, p. 399, (1931)) as *Asemoplus somesi.*

VIII, 30, 1926; (E. R. Tinkham); 1♂, 1♀; [Hebard Cln.][67]: VIII, 9, 1931; VIII, 30, 1926; (E. R. Buckell); 9♂, 17♀; [Canad. Dept. of Agr.]. Bertha Lake, near Waterton; VIII, 25, 1926; (Kenneth M. King); 1♂; [Hebard Cln.].[67]

BRITISH COLUMBIA: Field, Yoho National Park; 1922; (Titus Ulke); 1♂; [U.S.N.M.]. Invermere; VIII, 29, 1925; (E. R. Buckell); 2♂, 2♀; [Canad. Dept of Agr. and A.N.S.P.].[68] Mt. Kokanee, elevation 9000 feet; VIII, 10, 1903; (A. N. Caudell); 1♀; [U.S.N.M.].[69]

IDAHO: Wallace; VIII, 5, 1917; 1♂; [Hebard Cln.][66]: VII, 1929; (E. R. Buckell); 2♂; [Canad. Dept. of Agr.].

MONTANA: Logan Pass, Glacier National Park; VIII, 26, 1930; 10♂, 10♀; [Hebard Cln.].[70] Many Glacier [Camp], McDermott Lake, Glacier National Park; VIII, 10, 1931; (E. R. Buckell); 1♀; [Canad. Dept. of Agr.]. Avalanche Lake, Glacier National Park, elevation 4400 feet; VIII, 17, 1930; (E. R. Tinkham); 1♂, 1♀; [Hebard Cln.]. Lake Ellen Wilson, Glacier National Park, elevation 6800 feet; VIII, 19, 1918; (M. P. Somes); 1♂, 2♀; [U.S.N.M. and Hebard Cln.]. Upper Little St. Mary Valley, above Lake Ellen Wilson, Glacier National Park, elevation 6700 feet; VIII, 9, 1918; (M. P. Somes); 9♂, 13♀, 2 juv. ♀ (*type, allotype* and *paratypes* of *Asemoplus somesi*); [Hebard Cln. and U.S.N.M.]. "Great Northern [R.R.] about 7000 ft."; VIII, 27, 1926; 1♀; [Hebard Cln.].[71] Haugan, Missoula County; IX, 8, 1931; (R. H. Beamer and J. Nottingham); 13♂, 13♀; [Hebard Cln.]. Swan Range, elevation 7600 feet; VII, 31, 1904, VIII, 14, 1905; (M. J. Elrod); 1♂, 2♀; [Hebard Cln.].[71]

WASHINGTON: Mt. Rainier, Rainier National Park; (Caudell and Dyar); 10♂, 9♀; [U.S.N.M. and Hebard Cln.].[72] Paradise Valley, Mt. Rainier, Rainier National Park; [VII, 1906]; (Caudell); 2♂, 3♀; [Hebard and E. M. Walker Clns.].[72]

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[68] Recorded by Criddle as *hispidus* (56th Ann. Rep. Entom. Soc. of Ontario, p. 107, (1925)).

[69] Recorded by Caudell (Entom. News, XV, p. 63, (1904)) as *Podisma polita*, and by Hebard (Trans. Amer. Entom. Soc., XLV, p. 271, (1919)) as *Asemoplus somesi*.

[70] Recorded by Hebard (Proc. Acad. Nat. Sci. Phila., LXXXIV, p. 256, (1932)) as *Asemoplus somesi*.

[71] Recorded by Hebard (Proc. Acad. Nat. Sci. Phila., LXXX, p. 291, (1928)) as *Asemoplus somesi*.

[72] Recorded by Caudell (Proc. Entom. Soc. Wash., VIII, p. 134, (1907)) as *Asemoplus nudus*, and by Hebard (Trans. Amer. Entom. Soc., XLV, p. 275, (1919)) as *Asemoplus somesi*.

Explanation of Figures

Plate I

Fig. 22.—*Buckellacris chilcotinae chilcotinae* (Hebard). Male (paratype). Riske Creek, Chilcotin District, British Columbia. Dorsal view (× 3).

Fig. 23.—*Buckellacris chilcotinae tacoma* new subspecies. Male (type). Shadow Lake, Yakima Park, Mt. Rainier National Park, Washington. Dorsal view (× 3).

Fig. 24.—*Buckellacris hispida* (Bruner). Male (type). Colville Valley, Washington. Dorsal view (× 3).

Fig. 25.—*Buckellacris nuda nuda* (E. M. Walker). Male (paratype of *Asemoplus somesi* Hebard). Upper Little St. Mary Valley, Glacier National Park, Montana. Dorsal view (× 3).

Fig. 26.—*Buckellacris nuda nuda* (E. M. Walker). Female (allotype of *Asemoplus somesi* Hebard). Upper Little St. Mary Valley. Glacier National Park, Montana. Dorsal view (× 3).

Fig. 27.—*Buckellacris hispida* (Bruner). Female (allotype). Colville Valley, Washington. Dorsal view (× 3).

Plate II

Fig. 28.—*Buckellacris chilcotinae chilcotinae* (Hebard). Male (paratype). Riske Creek, Chilcotin District, British Columbia. Lateral view (× 3).

Fig. 29.—*Buckellacris chilcotinae tacoma* new subspecies. Male (type). Shadow Lake, Yakima Park, Mt. Rainier National Park, Washington. Lateral view (× 3).

Fig. 30.—*Buckellacris hispida* (Bruner). Male (type). Colville Valley, Washington. Lateral view (× 3).

Fig. 31.—*Buckellacris nuda nuda* (E. M. Walker). Male (paratype of *Asemoplus somesi* Hebard). Upper Little St. Mary Valley, Glacier National Park, Montana. Lateral view (× 3).

Fig. 32.—*Buckellacris nuda nuda* (E. M. Walker). Female (allotype of *Asemoplus somesi* Hebard). Upper Little St. Mary Valley, Glacier National Park, Montana. Lateral view (× 3).

Fig. 33.—*Buckellacris hispida* (Bruner). Female (allotype). Colville Valley, Washington. Lateral view (× 3).

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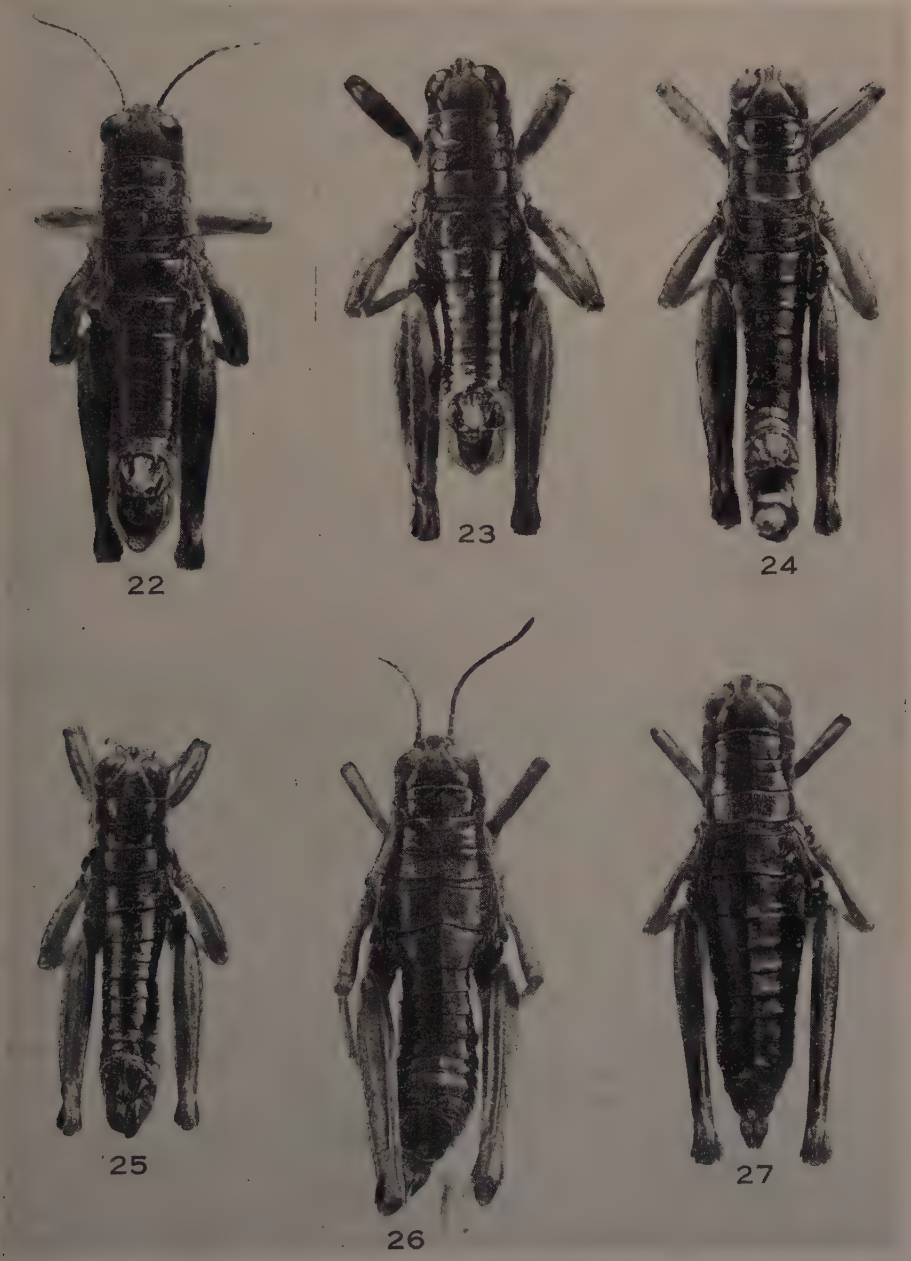
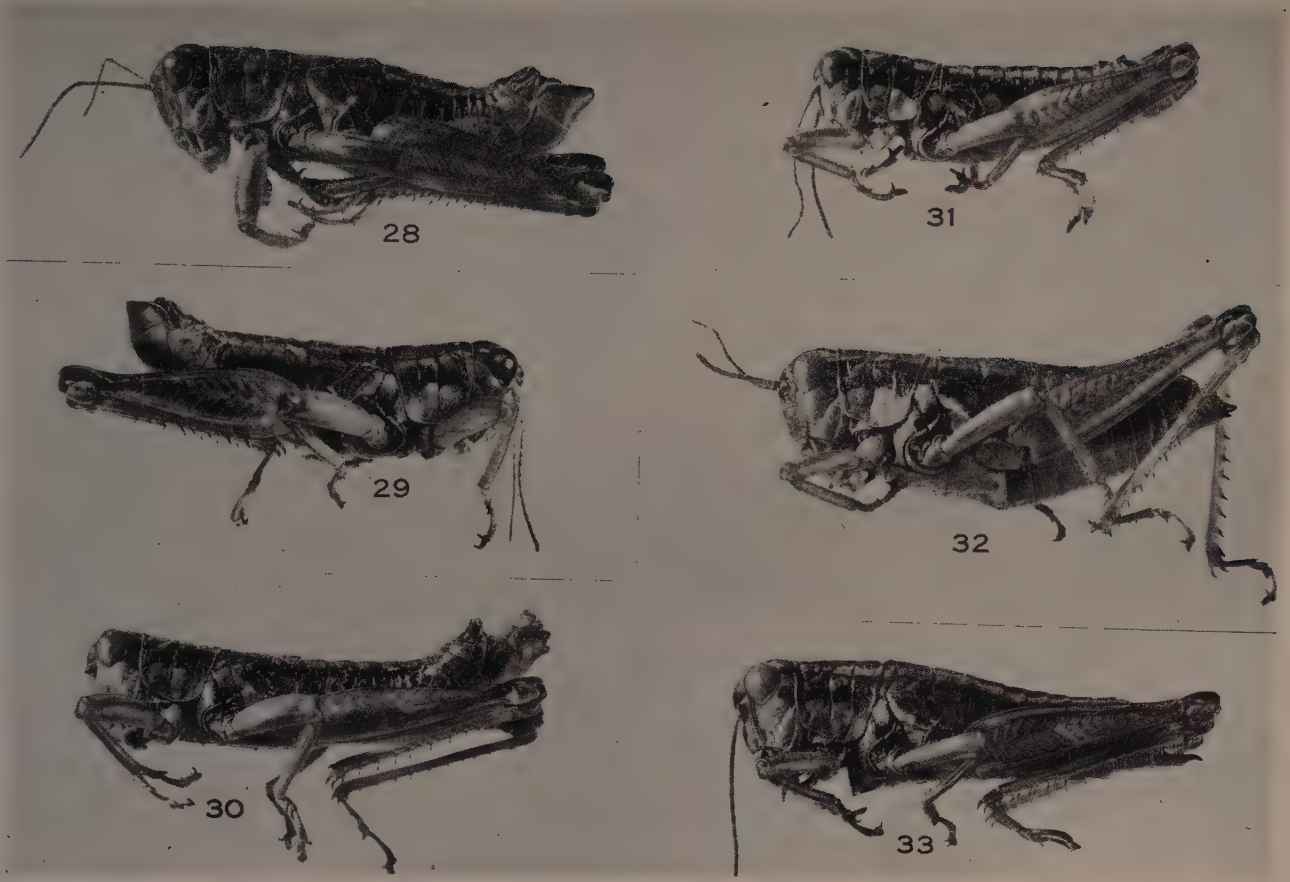


REHN AND REHN—CYRTACANTHACRIDOID GENERA



REHN AND REHN—CYRTACANTHACRIDOID GENERA

A SYSTEMATIC ANNOTATED ARRANGEMENT OF THE GENERA AND SPECIES OF THE INDO-AUSTRALIAN EPHYDRIDAE (DIPTERA)

I. THE SUBFAMILY PSILOPINAE

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In the course of my studies of the North American species of this family, I have also examined material from other parts of the world. Particularly interesting were those species from the Neotropical, African and Indo-Australian regions. Comparatively little or no revisionary work has been done on the species of these regions; in fact many have not been recognized since they were originally described, and no recent catalogue or list of the genera and species has been published.

In order that future students will have what may be termed a systematic catalogue or list of these species, the present series, of which this is the first, is prepared. In this work I endeavor to include all the species heretofore described as belonging to the family, and to assign them to their respective places in my arrangement; together with those I have described in the course of these studies. Those I have not recognized are placed by characters gleaned from their original descriptions, or as placed by their authors, or by other students whom I consider qualified to do so. Some species are so inadequately described that I cannot determine their affinity and these are, consequently, retained in their original genera.

No attempt is made to give keys to all the species, as I feel that our knowledge of this family in these faunas is not sufficient, particularly where a number of probably related species have not been definitely recognized.

For the material which has made this work possible, I am indebted particularly to the authorities of the Imperial Institute of Entomology, London [IIE]; of the United States National Museum [USNM]; of the Transvaal Museum, Union of South Africa [TM]; of the Deutsches Entomologisches Institut, Berlin-Dahlem [DEI]; and to Dr. A. L. Melander [Mel]. Several other institutions and individuals have also furnished me with material, and these will be noted in their respective places.

General localities previously recorded for the species are given with the bibliographical references. Additional records, given in detail, are of the material before me at this writing. Thus the known distribution can be readily ascertained.

In the "Catalogue of the Described Diptera from South Asia" by F. M. van der Wulp,[1] thirty-seven species are listed in the Ephydrinae. Most of these are from the Indo-Australian Region, but some are from China, of which, however, only the southern part comes within the present region. Since then, other species have been described by Grimshaw, Hutton, Kertesz, Coquillett, Meijere, Enderlein, Hendel, Frey, Becker, Malloch, Cresson, and Malloch and Tonnoir. The species described by these students will be cited in their respective genera as far as I am able to place them.

The region covered by the present series includes India, Ceylon, Burma, Indo-China, Southern China, i.e. north to about the 30th degree North Latitude, to Formosa, southwestward to and including the East Indies, Australia, New Zealand, Hawaii, and the Polynesian Islands, but not those islands west of and adjacent to South America.

Subfamily Psilopinae

Psilopinae Cresson, Trans. Amer. Ent. Soc., LI, p. 241, 1925. Psilopinae Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 102, 1942.

This is a large well marked group and abundantly represented in the Indo-Australian Region. In the present treatise fifty-two species are recognized; twenty-eight species unknown to me or

[1] Published by the Dutch Entomological Society, 1896, pp. 199–201.

unrecognized in the material now before me also are included. A key to the genera noted is given at the end of the group, but no attempt is made to key the species. However, certain characteristics are noted under some of the species. The species of this subfamily are very small (1 mm.) to medium size (2.5 mm.), with the head more or less disciform, circular or subelliptical in cephalic aspect, rarely broadest far above its transverse centerline; eyes rarely round and protruding; frontal (if present) reclinate; median facies bare, the facialia and facial series of setae practically parallel or concentric with the orbits, not converging dorsad to meet at the interfoveal carina; mouth generally narrow with distinct clypeus, never with oral cilia; dorsocentralis absent, but posterior intra-alar and generally the prescutellars, present; supra-alar rarely present.

Tribe Gymnopini

1922. Gymnopinae Cresson, Trans. Amer. Ent. Soc., xlvii, p. 326.
1942. Gymnopini Cresson, Trans. Amer. Ent. Soc., lxviii, p. 103.

ATHYROGLOSSA

1860. *Athyroglossa* Loew, Neue Beitr., vii, p. 12.

Athyroglossa freta Cresson

1925. *Athyroglossa freta* Cresson, Trans. Amer. Ent. Soc., li, p. 238. [Formosa.]

Formosa: Tainan, V, (H. Sauter), [DEI, 1].

In this species the face is relatively broad, about three times width of third antennal segment.

Athyroglossa evidens Cresson

1925. *Athyroglossa evidens* Cresson, Trans. Amer. Ent. Soc., li, p. 239. [New Guinea.]

The face and cheeks are relatively narrow, the latter not twice as broad as third antennal segment.

PARATHYROGLOSSA

1931. *Parathyroglossa* Hendel, Bull. Soc. R. Ent. Egypte, xv, p. 68.

Parathyroglossa ascabra (Cresson)

1925. *Athyroglossa scabra* Cresson, Trans. Amer. Ent. Soc., li, p. 238.

An Australian species, known only by the unique type from Sydney.

HOPLOAEGIS

1944. *Hoploaegis* Cresson, Notulae Nat., no. 135, p. 1.

Hoploaegis browni (Cresson)

1925. *Stratiothyrea browni* Cresson, Trans. Amer. Ent. Soc., li, p. 240. [Philippine Islands.]

1944. *Hoploaegis browni* Cresson, Notulae Nat., no. 135, p. 2.

Known only by the type from Manila.

A dark brown species with the four apical segments of fore tarsi, entire mid and hind legs, white. The scutellum is large, flat, quadrate, with bristle bearing tubercles at apical angles.

STRATIOTHYREA Meijere

1913. *Stratiothyrea* Meijere, Bijdr. tot de Dierkunde, Leiden, Af. xix, p. 66, pl. 1, fig. 26.

The general Gymnopine features and the narrow alula of the wings, as well as the pectinate arista, places this genus near *Athyroglossa* as the author stated. The convex subrotund abdomen with long tergites II to IV, as well as the enlarged *Ochthera*-like fore femora, at once distinguishes the species of this genus.

Stratiothyrea femorata Meijere

1913. *Stratiothyrea femorata* Meijere, Bijdr. tot de Dierkunde, Leiden, Af. xix, p. 66, pl. 1, fig. 26. [Island of Waigeoe.]

This species has the dorsal surfaces highly polished, including the scutellum, and about seven hairs on the arista.

New Brittain: Rabaul, VI, (J. L. Froggatt), [IIE, 1]. Admiralty Islands: Manus, III, (J. L. Froggatt), [IIE, 1].

Stratiothyrea matema Cresson

1936. *Stratiothyrea matema* Cresson, Proc. Cal. Acad. Sci., xxii, p. 51. [Santa Cruz, Solomon Islands.]

Very similar to *femorata* but the scutellum is scabrose and the arista has about 10 to 11 hairs.

TRIMEROGASTRA Hendel

1914. *Trimerogastra* Hendel, Suppl. Entom., III, p. 110. [Genotype: *T. cincta* n. sp.; Formosa.]

1914. *Tetramerogastra* Hendel, Suppl. Entom., III, p. 111. [Genotype: *T. fumipennis* n. sp.; Formosa.]

I cannot find any generic features which would separate the type species of these two here synonymized genera.

The systematic position of this genus is evidently not near *Clasiopella,* as Hendel placed it, but rather near the associates of *Gymnopa.* This is supported by the ample postbucca, the position of the ocellars, the slight facial gibbosity or tuberosity, the ample scutellum and the arrangement of the notopleurals. The pectinate arista and narrow alula would place it near *Athyroglossa,* but further than that I will not venture until a larger series is studied. Among the more anomalous features are the decidedly latero-clinate frontals and the short second vein, both of which suggest some of the associates of the genus *Psilopa.*

Trimerogastra cincta Hendel

1914. *Trimerogastra cincta* Hendel, Suppl. Entom., III, p. 111, figs. 6 and 7. [Formosa.]

1925. *Trimerogastra cincta,* Cresson, Trans. Amer. Ent. Soc., LI, p. 241.

Described from Anping, Formosa, and of which I have seen two paratypes.

FORMOSA: Takao, V 3, (H. Sauter), [HNM, 1]. INDIA: Guindy, Madras, VIII 17, (T. B. Fletcher), [IIE, 1].

The Indian specimen seems to be conspecific with the paratypes I have seen.

Trimerogastra fumipennis (Hendel)

1914. *Tetramerogastra fumipennis* Hendel, Suppl. Entom., III, p. 111. [Formosa.]

Described from Anping, Formosa, and known to me by the following:

FORMOSA: Tainan, II, (H. Sauter): Kanshizei, IV, (H. Sauter): [DEI, 2].

The synonymy of *Trimerogastra* and *Tetramerogastra* is based on these two specimens, which differ from those of *cincta* most noticeably by their larger size, much more scabrose mesonotum and scutellum and the longer, straighter second wing vein.

Trimerogastra longivena Bezzi

1928. *Trimerogastra longivena* Bezzi, Dipt. Fiji Isl., (Brit. Mus. Pub.), p. 154. [Java.]

This species is unknown to me. Several features described suggest that the species is not congeneric with *cincta*.

GYMNOPIELLA new genus

GENOTYPE: *Gymnopa paucula* Cresson, 1934.

The type species cannot be retained in *Gymnopa* as originally described, because (1) of its pectinate arista; (2) subhemispherical abdomen; (3) lacking strong surface sculpturing, except on the face. The setation is more strongly developed than in *Gymnopa,* particularly as regards the presence of ocellars. That species has much the appearance of those of the genus *Stratiothyrea,* but the broad alula and non-incrassate fore femur, as well as the absence of the scutellar tubercles, will exclude it. These features seem of sufficient importance to warrant distinct generic separation.

Similar to *Gymnopa,* with strong inner vertical, weaker ocellars which are aligned with the anterior ocellus, strong divergent postocellars, very weak to microscopical frontal and frontorbital. Face much as in *Gymnopa,* with median tuberosity, transversely rugose facialia, strongly emarginated epistoma, strongly exerted clypeus. Antennae slightly above center-line of eyes; II with dorsal seta; arista with well separated, short, straight or slightly curved hairs.

Mesonotum strongly convex, with numerous, irregularly arranged setulae, emanating from minute pits; one intra-alar near posterior margin; one to two notopleurals, the posterior very strong, not removed dorsad. Abdomen rotund, subhemispherical; tergites II to IV very long, occupying nearly the entire abdomen, the lateral margins not revolute; V very short.

Fore femur not unusually stout, without flexor spination. Wings as in *Gymnopa.*

Gymnopiella paucula (Cresson)

1934. *Gymnopa paucula* Cresson, Trans. Amer. Ent. Soc., LX, p. 199.

Known to me only by the type series from Palmerton, Northern Australia.

CHLORICHAETA Becker

1923. *Chlorichaeta* Becker, Denkschr. Acad. Wissen. Wien, XCVIII, p. 23.

Chlorichaeta tuberculosa Becker

1923. *Chlorichaeta tuberculosa* Becker, Denkschr. Acad Wissen. Wien, XCVIII, p. 74, fig. 6. [Egyptian Sudan.]

INDIA: Sidhout Cuddappah, Madras, III, 9, (Bred from rotting oil cake manure), [IIE, 4].

These Indian specimens show very little difference from those I have seen from Africa, except in their larger size, more quadrate frons and the more flattened head profile. The antennae and the surrounding region are darker than in the African individuals before me from Lourenco Marques, but this may be merely a varietal character. That the species breeds in oil cake manure may be influential in establishing its rather broad distribution.

CHAETOMOSSILUS

1934. *Chaetomossilus* Hendel, Ark. f. Zool., XXV, A, (21), p. 14.

Chaetomosillus dentifemur (Cresson)

1925. *Gymnopa dentifemur* Cresson, Trans. Amer. Ent. Soc., LI, p. 233. [Formosa.]

CHINA: Shin-Kai Mt., Omei, Szechuan, 4400 ft. alt., IX 19, (D. C. Graham), [USNM, 1]. Suifu, Szechuan, IX, (D. C. Graham), [USNM, 2]. FORMOSA: Tainan, II, (H. Sauter), [ANSP, 1]. INDIA: Northwest India, (Fischer), [Vienna N. Mus., 2].

A species recognized among those of this subfamily with bare arista, by having well developed frontals, ocellars, and two notopleurals.

GYMNOPA

1820. *Gymnopa* Fallen, Dipt. Suec., Oscin., p. 10.

Gymnopa grandis Cresson

1925. *Gymnopa grandis* Cresson, Trans. Amer. Ent. Soc., LI, p. 232. [Formosa.]

A large (3 mm.), subopaque, brown pollinose species, with shining, somewhat cinereous fasciated abdomen; antennae and tarsi pale; mesonotum and scutellum microgranulose.

The only species of the genus known to me from this region and only by the type (♀?) from Formosa.

The two following species described by Walker were doubtfully referred to this genus, and both were based on specimens without heads. The brief, superficial descriptions are insufficient to determine their generic or even their family status. Consequently, until their types, which I was unable to have located in the British Museum (Natural History) Collection, are critically studied, they remain unrecognizable in the Ephydridae. The other one described by Malloch is probably correctly placed, but I have not recognized it in the material at hand.

Gymnopa? gutticosta Walker

1857. *Gymnopa? gutticosta* Walker, Proc. Linn. Soc. London, Zool., I, p. 136. [♀, Sarawak, Borneo.]

Gymnopa? infusca Walker

1857. *Gymnopa? infusca* Walker, Proc. Linn. Soc. London, Zool., I, p. 136. [Sarawak, Borneo.]

Gymnopa marquesana (Malloch)

1933. *Mosillus Marquesana* Malloch, Bull. B. P. Bishop Mus., no. 114, p. 13, fig. 4. [Marquesas Islands.]

PLACOPSIDELLA

1901. *Placopsidella* Kertesz, Termez. Fuzet., XXIV, p. 424.
1912. *Oscinomima* Enderlein, Stet. Ent. Zeits., LXXXIII, p. 163.
1912. *Encastes* Lamb, Trans. Linn. Soc. London, (2), Zool., XV, p. 319.
1925. *Placopsidella*, Cresson, Trans. Amer. Ent. Soc., LI, p. 230.

The above synonymy has been previously reported by Cresson (1925).

The separation of this genus from *Gymnopa* may be questioned. The salient differences seem to be in its general opacity and the elongation of the bare facial tubercle.

Placopsidella cynocephala Kertesz

1901. *Placopsidella cynocephala* Kertesz, Termez Fuzet., XXIV, p. 425. [New Guinea.]
1912. *Encastes scotti* Lamb, Trans. Linn. Soc. London, (2), Zool., XV, p. 320, pl. 15, figs. 21, 22. [Seychelles Islands.]
1915. *Placopsidella liparoides* Meijere, Tijds. v. Entom., LVIII, Suppl., p. 61. [Simalu Island.]
1925. *Placopsidella cynocephala,* Cresson, Trans. Amer. Ent. Soc., LI, p. 230. Synonymy.

JAVA: Batavia, IV, (Bryant & Palmer), [USNM, 3]. NEW GUINEA: Seleo, Berlinhafen, (Biro), [Hungary N. Mus., 1]. SOLOMON ISLANDS: San Christobal—Kirakiva, V 7, (R. A. Lever; on dead trees), [IIE, 6]. Tulagi—III 19 to X, (R. A. Lever; on dead coral on beach; on cocoa flowers), [IIE, 14]. Guadalcanal—IV, (R. A. Lever), [IIE, 21]. GUAM: VI 24, (Honolulu Clipper); Sumay, X 16, (R. G. Oakley; Philippine Clipper—Port of Manila; China Clipper), [USNM, 11].

This species has also been described as *Encastes scotti* Lamb, 1912 from the Seychelles Islands; and as *Placopsidella liparoides* Meijere, 1915, from Simalu Island. The above synonymy I have already given (1925).

A well distributed Indomalayan species, easily recognized by the elongated median facial tubercle which is well shown in Lamb's figure of *E. scotti.*

Placopsidella signatella (Enderlein)

1912. *Oscinomima signatella* Enderlein, Stet. Ent. Zeits., LXXXIII, p. 164. [Formosa.]
1912. *Placopsidella signatella,* Kertesz, Ann. Mus. Nat. Hung., X, p. 548.

Unknown to me, but Kertesz has seen Enderlein's material and considered the species congeneric, but not conspecific with *cynocephala.*

Tribe Atissini

1942. Atissini Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 103.

HECAMEDE

1839. *Hecamede* Haliday, An. Nat. Hist., III, p. 224.

Hecamede persimilis Hendel [2]

1913. *Hecamede persimilis* Hendel, Suppl. Entom., II, p. 99. [Formosa.]
1925. *Hecamede persimilis,* Cresson, Trans. Amer. Ent. Soc., LI, p. 229. Notes.

FORMOSA: Takao, IV 23; V 3, (H. Sauter), [Hung. N. Mus., 5]. Tainan, X, (H. Sauter), [DEI, 2]. WAKE ISLAND: VIII 1, (E. H. Bryan, Jr.), [B. Bishop Mus., 6]. HAWAII: Oahu—Waimanato Bay, VI 2: Hanauma Bay, VI 28, (all F. X. Williams; near crab hole), [all Haw Ent. Soc., 3].

HEMICYCLOPS

1913. *Hemicyclops* Meijere, Bijdr. tot de Dierkund., XIX, p. 66.

Hemicyclops planifrons Meijere

1913. *Hemicyclops planifrons* Meijere, Bijdr. tot de Dierkund., XIX, p. 67, pl. 20, fig. 27. [Waigeoe Island.]

What appears to be this species is known to me by one individual from Tulagi, Solomon Islands, V 29, (R. A. Lever; on *Cocos*), [IIE], but in too poor condition to determine with certainty. From this specimen, which at least is congeneric with *planifrons,* I note its relationship to *Hecamede persimilis* differing in its more horizontal eyes, flattened frons, which latter has but two normal short ocellars situated well cephalad of the anterior ocellus. Other characters are obscured by the imperfect condition of the specimen.

Hemicyclops maculipleurum Meijere

1914. *Hemicyclops maculipleurum* Meijere, Tijds. v. Entom., LVII, p. 248. [Java.]

Unknown to me, but probably congeneric if not synonymous with *planifrons.*

[2] This may be *Notiphila grandifera* Thomson, 1868 (K. Svenska Freg. Eugenies Resa, Zool., I, p. 594), described from Ross Island, Burma.

ALLOTRICHOMA

1896. *Allotrichoma* Becker, Berl. Ent. Zeit., XLI, p. 121.

Allotrichoma alium Cresson

1929. *Allotrichoma alium* Cresson, Trans. Amer. Ent. Soc., LV, p. 173. [New Guinea.]

1936. *Allotrichoma alium* Cresson, Proc. Cal. Acad. Sci., (4), XXII, p. 52, [Santa Cruz Islands.]

A dark brownish species, with cinereous frontal orbits, face and cheeks; pleura with well defined grayish notopleural stripe, and abdomen with similarly colored lateral spots; tibiae and tarsi pale; clypeus shining.

Allotrichoma biroi Cresson

1929. *Allotrichoma biroi* Cresson, Trans. Amer. Ent. Soc., LV, p. 174. [India.]

Possibly a subspecies of the above. The face is dark or somewhat grayish ventrad, but otherwise not different from *alium*.

Allotrichoma livens Cresson

1929. *Allotrichoma livens* Cresson, Trans. Amer. Ent. Soc., LV, p. 174. [India.]

Before me is a female from Coimbatore, South India, IV 20, (Y. R. Goll; predaceous on cotton aphis), [IIE].

A cinereous species with some dark vestiture which is pale olivaceous; no defined notopleural stripe, nor any abdominal spots; clypeus cinereous, and tibiae and tarsi entirely pale.

I have seen material from Formosa which may prove to be a form of this species.

ATISSA

1839. *Atissa* Haliday, An. Nat. Hist., III, p. 404.

Atissa antennalis Aldrich

1931. *Atissa antennalis* Aldrich, Proc. Hawai. Ent. Soc., VII, p. 395. [Hawaii.]

A dark species with long white aristal hairs. Originally described from Hawaii, and not since recorded. It is unknown to me.

Atissa suturalis Cresson

1929. *Atissa suturalis* Cresson, Trans. Amer. Ent. Soc., LV, p. 177. [Australia.]

Known to me only by the type.

A dark species with a strong dorsocentral seta at the mesonotal suture.

Atissa species

FORMOSA: Tainan, X 1908, (H. Sauter), [ANSP., 3]. Not in sufficiently good condition for critical analysis. Near *pygmaea* in possessing four series of mesonotal setulae between the intra-alars, but the vestiture appears darker, while the setulae are stronger and somewhat pale.

Tribe DISCOCERININI

1942. Discocerinini Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 104.

DISCOCERINA Macquart

1835. *Discocerina* Macquart, Hist. Nat. Ins., Dipt., II, p. 527.

With the exception of Dr. J. W. de Meijere [3] few students have studied the Indo-Australian species of this genus. Unfortunately the descriptions by these students are deficient in many structural characters which are essential for positive generic and specific determination. That some of those species belong to other closely allied genera, which now constitute the tribe Discocerinini, is evident, but no satisfactory assignment can be made for them until those defining features can be determined. During my studies in this group I found very satisfactory characters in the number and arrangement of the facial bristles, in the arrangement of the notopleurals, setulation of the parafacies and notopleura. These features should be noted in the description of the species of this tribe.

Discocerina (Discocerina) mera Cresson

1939. *Discocerina mera* Cresson, Notulae Nat., no. 21, p. 6. [Formosa.]

Possibly allied to *D. atrifacies* Malloch, from Samoa.

A series of twelve specimens from "Zami" or "Lami," Fiji Islands, XII 14, (R. A. Lever), [IIE] not materially different from

[3] Tijds. v. Ent., LIX, pp. 268–270, 1916.

the type series from Formosa except there are four facials instead of three and these are closer together than in typical *mera*. The material is not in first class condition, so I hesitate to consider them definitely as this species. They, however, do not entirely agree with the original description of *atrifacies*.

In *mera* the parafacies is linear, not setulose as originally described.[4] The groove limiting the parafacies is difficult to discern, which may account for the erroneous statement made. The position of the notopleurals is, however, typical of the genus *Discocerina*.

Discocerina (Lamproclasiopa) laevior Cresson

1934. *Ditrichophora laevior* Cresson, Trans. Amer. Ent. Soc., LX, p. 200. [India.]

Described and known only from Darjeeling, India.

Because of the setulose notopleura and the caudad position of the anterior notopleural, this species is removed to *Discocerina*.

The following Indo-Australian species have been described in, or assigned to, *Discocerina* or *Clasiopa*. With two exceptions, I have not recognized them in the material passing through my hands. However, the two species above noted may be among them.

Discocerina albitarsis (van der Wulp)

1897. *Clasiopa albitarsis* van der Wulp, Veth's Mid-Sumatra, IV, (9), p. 56. [Sumatra.]

1915. *Clasiopa albitarsis,* Meijere, Tijds. v. Ent., LVIII, Suppl., p. 62. [Simalu Islands.]

1916. *Discocerina albitarsis* "n. sp.," Meijere, Tijds. v. Ent., LIX, p. 271.

1924. *Discocerina albitarsis,* Becker, Entom. Mitt., XIII, p. 93. [Formosa.]

This species was originally described from Sumatra, and again characterized by Meijere on material from the Simalu Islands, and again by the same author, in a key to the Java and Sumatra species of the genus as "*Discocerina albitarsi* n. sp." Again Becker characterized it on material from Formosa. It is possibly a member of *Ditrichophora*.

[4] The series of strong down-curved setulae are on the facialia close to the parafacies groove, not on the parafacies, and in consequence the species is not a member of the Obscurella Group.

Discocerina setosa Meijere

1916. *Discocerina setosa* Meijere, Tijds. v. Ent., LIX, p. 268. [Java.]

Possibly belongs to the genus *Polytrichophora.* It is described as possessing four to five facials, but no mention is made of any of these as the outwardly inclined secondary series, characteristic of that genus.

Discocerina tarsalis Meijere

1916. *Discocerina tarsalis* Meijere, Tijds. v. Ent., LIX, p. 268. [Java.]

I cannot suggest any more satisfactory assignment for this species.

Discocerina quadriciliata Meijere

1916. *Discocerina quadriciliata* Meijere, Tijds. v. Ent., LIX, p. 270. [Java.]

Apparently belongs to *Discocerina.*

Discocerina maculicornis Meijere

1916. *Discocerina maculicornis* Meijere, Tijds. v. Ent., LIX, p. 270. [Java.]

Probably belongs to this genus.

Discocerina hepatica Meijere

1916. *Discocerina hepatica* Meijere, Tijds. v. Ent., LIX, p. 268. [Java.]

This is possibly *Hecamedoides caprina* Cresson.

Discocerina canolimbata Meijere

1916. *Discocerina canolimbata* Meijere, Tijds. v. Ent., LIX, p. 269. [Java.]

This is possibly *Hecamedoides invida* Cresson.

Discocerina biseta Meijere

1916. *Discocerina biseta* Meijere, Tijds. v. Ent., LIX, p. 268. [Java.]

I cannot suggest any other assignment.

Discocerina brunneifrons Meijere

1916. *Discocerina brunneifrons* Meijere, Tijds. v. Ent., LIX, p. 270. [Java.]

Possibly belongs to *Polytrichophora.*

Discocerina flavitarsis Frey

1917. *Discocerina flavitarsis* Frey, Ofvers. Finska Vet. Soc., Forh., LIX, (A, no. 20), p. 30. [Ceylon.]

Probably properly assigned.

Discocerina pernigra Becker

1924. *Discocerina pernigra* Becker, Entom. Mitt., XIII, p. 93. [Formosa.]

Probably belongs to *Ditrichophora.*

Discocerina infantina Becker

1924. *Discocerina infantina* Becker, Entom. Mitt., XIII, p. 93. [Formosa.]

Unknown to me but possibly belongs to *Polytrichophora.*

Discocerina atrifacies Tonnoir and Malloch

1934. *Discocerina atrifacies* Tonnoir and Malloch, Ins. Samoa, VI, p. 318. [Samoa.]

This species is unknown to me, but it is possibly near *D. mera* Cresson, from Formosa.

Discocerina communis Tonnoir and Malloch

1934. *Discocerina communis* Tonnoir and Malloch, Ins. Samoa, VI, p. 319. [Samoa.]

Said by the authors to be allied to the preceding species. It is unknown to me.

POLYTRICHOPHORA

1924. *Polytrichophora* Cresson, Entom. News, XXXV, p. 161.

Polytrichophora flavitarsis (Tonnoir and Malloch)

1926. *Clasiopa flavitarsis* Tonnoir and Malloch, Rec. Cant. Mus., III, p. 13. [New Zealand.]

1931. *Discocerina mallochi* Hendel, Verh. Zool.,-Bot. Gesells. Wien, LXXX, p. 10. (New name for *Clasiopa falvitarsis* T. & M., not *Discocerina flavitarsis* Frey, 1917.)

As *Clasiopa* is synonymous with *Discocerina,* Hendel renamed Tonnoir and Malloch's species, but as Frey's name has never been combined with *Clasiopa,* and as *Clasiopa flavitarsis* is removed to *Polytrichophora,* Hendel's new name is unnecessary.

This species is known to me from:

NEW ZEALAND: Otago, (R. Osten Sacken), [DEI, 1].

Polytrichophora affinis (Tonnoir and Malloch)

1926. *Clasiopa affinis* Tonnoir and Malloch, Rec. Cant. Mus., III, p. 13. [New Zealand.]

Although this species is unknown to me, the two series of facials certainly places it in this genus.

Polytrichophora dubia (Malloch)

1934. *Discocerina dubia* Malloch, Ins. Samoa, VI, p. 320. [Samoa.]

This species also is placed here because of its two series of facials.

Polytrichophora luteicornis Cresson

1929. *Polytrichophora luteicornis* Cresson, Trans. Amer. Ent. Soc., LV, p. 166. [Singapore.]

FRENCH INDO CHINA: "Mittel Annam," (Fruhstorfer), [ANSP, 1]. CEYLON: Mahagama, II 15, [IIE, 3].

The tibiae in this series are almost totally dark.

Polytrichophora canora Cresson

1929. *Polytrichophora canora* Cresson, Trans. Amer. Ent. Soc., LV, p. 165. [Formosa.]

FORMOSA: Tainan, X, V, (H. Sauter); Taihoku, XI 7, (H. Sauter); Kankau, Koshun, VII, VIII, (H. Sauter); [DEI, 17].

PHILIPPINE ISLANDS: Mt. Makling, Luzon, (C. F. Baker), [USNM, 2].

HECAMEDOIDES Hendel

1917. *Hecamedoides* Hendel, Deut. Ent. Zeits., 1917, p. 41.

The species assigned to this genus have the anterior notopleural well cephalad in the humeral angle of the notopleura. The face has three primary facials of which the uppermost is on a slight but distinct papilla, laterad of which is a more or less developed seta which is often dorsolaterally inclined. The former may be weak and not apparently of the primary series, while the dorsolaterally inclined seta, on the contrary, may be very strongly developed. All the species of this genus known to me are opaque, densely pollinose.

Hecamedoides aurigera Cresson

1929. *Hecamedoides aurigera* Cresson, Trans. Amer. Ent. Soc., LV, p. 168. [New Guinea.]

The dorsolaterally inclined facial seta is very weak, almost indiscernible. The general color of the dorsal vestiture is yellowish.

Hecamedoides caprina Cresson

1929. *Hecamedoides caprina* Cresson, Trans. Amer. Ent. Soc., LV, p. 168. [Formosa.]

INDIA: Tondiarpet, Madras, (T. B. Fletcher; VIII 13; over open sewer), [IIE, 4].

This may be *Discocerina hepatica* de Meijere, from Java. The series before me from the widely separated localities cited above, show some variation. Frons usually quadrate, seldom broader than long (two ♀ paratypes have it noticeably broader), uniformly ochraceous, the narrow orbits whitish; frontorbitals distinctly anterior to line of anterior ocellus; frontal close to and slightly in advance of the frontorbital; arista with six to seven hairs; tibiae of the males are yellow, rarely dark, of the females the hind pair are dark.

Hecamedoides invida Cresson

1929. *Hecamedoides invida* Cresson, Trans. Amer. Ent. Soc., LV, p. 169. [New Guinea.]

FORMOSA: Tainan, V, (H. Sauter), [DEI, 17].

Very similar to *caprina*. Frons broader than long, rarely quadrate, with rather noticeable brown transverse stripes at ocellars; frontal and frontorbital close together, almost aligned with anterior ocellus. Upper secondary facial is ventrad of the upper cruciate primary, thus differing from *aurigera*. Arista usually with greater number of hairs, but there is much variation in this, particularly in the males, from six to nine, in the females seven to nine. All tibiae in both sexes are dark.

This may prove not to be specifically separate from *caprina*. The width of the frons, position of the frontals alone cannot be considered; only the cinereous anterior part of the frons in the present species, and the color of the tibiae seem to be of greater value.

In some respects this species suggests *Discocerina canolimbata* Meijere from the description of that species, but the wings here are more lactaceous than "glashell."

Hecamedoides hyalinus Cresson

1929. *Hecamedoides hyalinus* Cresson, Trans. Amer. Ent. Soc., LV, p. 169. [New Guinea.]

Known only by the type, which has been somewhat damaged, since its description.

Hecamedoides sinensis Cresson

1939. *Hecamede sinensis* Cresson, Notulae Nat., no. 21, p. 6. [China.]

Known only by the type from Foochow, China.

HOSTIS new genus

Allied to *Ditrichophora* in having the notopleura bare with the anterior of the two notopleurals situated well cephalad. The two facials are set very low in the facial profile. The face is rather flattened with facial series widely separated.

Head rather disciform, almost as broad as high and much higher than long; the conjoined fronto-facial profile almost vertical. Occiput concaved with the posterior orbits visible in profile. Posterior ocelli slightly removed from the sharp vertex; well developed postocellars; the ocellars situated well cephalad of anterior ocellus, aligned with the reclinate frontals; proclinate frontorbitals strong. Face almost as broad as frons, rather flat; the weak carina dilating ventrad and the weak foveae correspondingly diverging ventrad, resulting in widely separated facialia; the upper facial aligned with buccal orbit, the second facial well caudad, ventrad of eye. Postbucca rounding into occiput; buccal bristle strong. Antennae typical; segment II with small spine, III almost disciform; arista with few well separated hairs.

Mesonotal setulae numerous not seriated; prescutellars well caudad; presutural strong; supra-alar weak; humeral and the two notopleurals equally spaced; two strong mesopleurals. Scutellum ample, setulose; apicals approximate; laterals well basad with small intermediates.

Abdomen ovate, margin revolute; marginal setae not long. Legs normal, rather densely setulose; no flexor comb on fore femur. Wings long, with short costal seta at vein I; vein II long and straight to costa.

GENOTYPE: *Hostis guamensis* new species.

Hostis guamensis new species

Recognized among the Ditrichophorae by the broad rather flattened face with the two facials set very low.

Pale, yellow: antennae, palpi, tarsi except apices, halteres and wing veins.

Opaque, cinereous with slight ochraceous tint on dorsal surfaces, but abdomen more shining, contrastingly black with brown dusting; legs more or less blackish.

Frons about .3 width of head with parallel orbits; proclinate frontorbital in advance of the frontal, with a minute second one caudad. Face, in profile, almost flat with two weak convexities, one above the other below line of the upper facials. Cheeks about equal to length of antenna III. Scutellum flat, about as long as broad. Wings immaculate, somewhat lactaceous; costa II almost three times as long as III.

Length, 2.7 mm.

Type.—Female; Sumay, Guam; October 26, 1938; (R. G. Oakley); "China Clipper, ports Alameda, Cal. Hon. Midway; Guam no. 1327. Lot no. 3818297"; [U. S. Nat. Mus.]

Paratype.—♀; with same data, but "China Clipper Cal. Hon. Wake Midway Is., Guam no. 1328. Lot no. 818298."

DITRICHOPHORA

1914. *Ditrichophora* Cresson, Entom. News, XXV, p. 159.

Ditrichophora triseta Cresson

1934. *Ditrichophora triseta* Cresson, Trans. Amer. Ent. Soc., LX, p. 200. [India.]

Known only by the type from Konkau, India.

PECTINIFER

1944. *Pectinifer* Cresson, Noctulae Nat., no. 135, p. 4.

Pectinifer niveifrons (Cresson)

1926. *Discocerina niveifrons* Cresson, Trans Amer. Ent. Soc., LII, p. 251. [New South Wales.]

In possessing three facials, bare notopleura and a more or less distinct fore femoral flexor comb, I must assign this species to the genus *Pectinifer,* heretofore containing but one, a Neotropical species. This species cannot well be associated with the members of *Basila,*[5] a subgenus of *Discocerina.*

The dense white cephalic part of the frons is a distinguishing feature of the present species.

[5] Trans. Amer. Ent. Soc., LXVIII, p. 116, 1942.

Tribe Psilopini

1942. Psilopini Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 105.

ACTOCETOR

1903. *Actocetor* Becker, Mitt. Zool. Mus. Berlin, II, p. 169.

Actocetor margaritatus (Wiedemann)

1830. *Ephydra margaritata* Wiedemann, Aussereu. Zweifl. Ins., II, p. 594. [Egypt.]
1903. *Actocetor margaritatus,* Becker, Mitt. Zool. Mus. Berlin, II, p. 170, pl. 4c, figs. 27 and 29. [Egypt.]

Originally described from Egypt, but ranges into India, from which country I have seen an individual from Coimbatore, [IIE].

Actocetor elegans Hendel

1917. *Actocetor elegans* Hendel, Deut. Ent. Zeits., 1917, p. 41. [Ceylon.]
1929. *Actocetor elegans* Cresson, Trans. Amer. Ent. Soc., LV, p. 171. [Amboina.]

Ceylon: Kanthalay and Matale, (W. Horn), [DEI, 5].

TRYPETOMIMA Meijere

1916. *Trypetomima* Meijere, Tijds. v. Ent., LIX, p. 265.
1929. *Trypetomina* Cresson, Trans. Amer. Ent. Soc., LV, p. 171. (Error for *Trypetomima.*)
1934. *Eupsilopa* Malloch, Ins. Samoa, VI, p. 315.
1936. *Trypetomima* Cresson, Proc. Calif. Acad. Sci., (4), XXII, p. 52.

The characteristics, systematic position, and the above synonymy of this genus have been discussed, and a key to its known species has been given by me (1936). It is, as far as known, an Indo-Australian genus.

Trypetomima pulchripennis Meijere

1916. *Trypetomima pulchripennis* Meijere, Tijds. v. Ent., LIX, p. 266, pl. 9, fig. 18 (of wing). [Java.]

A dark species with maculated mesonotum, scutellum and abdomen; the wings are fenestrated with one to two large clear spots in marginal and submarginal, and first posterior, accompanied by a number of smaller spots in the other cells; antennae and femora dark.

I have not seen this species.

Trypetomima formosina (Becker)

1924. *Actocetor formosinus* Becker, Entom. Mitt., XIII, p. 90. [Formosa.]
1929. *Trypetomina formosina,* Cresson, Trans. Amer. Ent. Soc., LV, p. 172. (*Trypetomina* error for *Trypetomima.*)

FORMOSA: Anping, V, (H. Sauter), [HNM, 1]. Type locality.

A somewhat cinereous species with shining abdomen. Apparently similar to *T. pulchripennis* Meijere, particularly in the wing maculation, but the antennae and fore legs are entirely pale and the mesonotum and abdomen are not maculate, at least not distinct on the former and the latter is banded, not vittate.

Trypetomima solitaria Cresson

1929. *Trypetomina solitaria* Cresson, Trans. Amer. Ent. Soc., LV, p. 172. [Guam.]
1934. *Trypetomima solitaria* Cresson, Proc. Cal. Acad. Sci., (4), XXII, p. 53. [Santa Cruz Islands.]

NEW GUINEA: Friedrich Wilhelm Hafen, VI, [HNM, 1]. ADMIRALTY ISLANDS: Manus, VI 1, (J. L. Froggatt), [IIE, 4].

Similar to *formosina* but smaller and darker, with very narrow cheeks; with but one clear spot in marginal cell and all spots arranged in three transverse series.

Trypetomima pulchripennis Meijere

1916. *Trypetomima pulchripennis* Meijere, Tijds. v. Entom., LIX, p. 266, pl. 9, fig. 18 (of wing). [Java.]

Unknown to me but evidently a member of this genus.

Trypetomima completa Cresson

1929. *Trypetomina completa* Cresson, Trans. Amer. Ent. Soc., LV, p. 173. [Guam.] (Error for Trypetomima.)
1934. *Eupsilopa fascipennis* Malloch, Ins. Samoa, VI, p. 316, fig. 13. [Samoa.]

Known to me from the type locality. I consider the synonymy of *fascipennis* on the basis of the description and figure of the wing of that species, which is also the genotype of *Eupsilopa,* which makes that genus a synonym of *Trypetomima.*

A shining to polished black species, with antennae and legs yellow. It is distinguished from the other known species of the genus in having the wings marked with three clear bands.

CLASIOPELLA

1914. *Clasiopella* Hendel, Suppl. Entom., III, p. 109.

Clasiopella uncinata Hendel

1914. *Clasiopella uncinata* Hendel, Suppl. Entom., III, p. 110, fig. 4 & 5. [Formosa.]

1925. *Clasiopella uncinata,* Cresson, Trans. Amer. Ent. Soc., LI, p. 248. [Formosa.]

FORMOSA: Anping, IV–V, (H. Sauter), [HNM, 2; DEI, 1]. Topotypes. GUAM: On aeroplanes China Clipper, Philippine Clipper, California Clipper and Boering Cipper, (R. G. Oakley), [USNM, 25]. MIDWAY ISLAND: On Philippine Clipper at Midway, (W.B.), II 27, VI 3, X 22, (F.C.N.), [Hawaii S.P.A., 53].

A species of peculiar distribution. I have seen material from Kenya, Africa, taken on or about aeroplanes.

PSILOPA

1823. *Psilopa* Fallen, Dipt. Suec., Hydrom., p. 6.

Psilopa (Psilopa) dimidiata Cresson

1922. *Psilopa dimidiata* Cresson, Entom. News, XXXIII, p. 137. [United States.]

1925. *Clasiopella dimidiata* Cresson, Trans. Amer. Ent. Soc., LI, p. 248. [Formosa.]

The Formosa record may prove to be that of another species. *Dimidiata* belongs to a group which is difficult to place and I have not seen sufficient material to enable me to separate the United States and Formosa individuals. Furthermore it may prove to be the Palearctic *Psilopa nigritella* Stenhammar.

Psilopa (Psilopa) flavimana (Hendel)

1913. *Psilopa flavimanus* Hendel, Suppl. Entom., II, p. 97. [Formosa.]

1925. *Psilopa flavimanus,* Cresson, Trans. Amer. Ent. Soc., LI, p. 246. [India, French Indo China.]

CEYLON: (W. Horn), [DEI, 1.]

A member of the *polita* assemblage, with all tibiae and tarsi, pale. There is comparatively little metallic color reflected from the shining surfaces.

Psilopa (Psilopa) mentata Cresson

1925. *Psilopa mentata* Cresson, Trans. Amer. Ent. Soc., LI, p. 245. [Middle Annam.]

CEYLON: (W. Horn), [DEI, 4]. INDIA: Arabidagool Est., Mysore, III–IV, [IIE, 1]. SIAM: Pahtoop Mt., I 23, (T. D. A. Cockerell), [IIE, 1]. MALAYA: Tanah Rata, VIII 5, (H. T. Pagden), [IIE, 4]. FORMOSA: Polisha, XII, (H. Sauter), [DEI, 8]. AUSTRALIA: Greenmount, Queensland, III 22, (T. D. A. Cockerell), [IIE, 1].

Very much like *polita,* apparently differing in but a few characters. Smoother, more highly polished with strong metallic reflections. Face more broadly convex, with narrow foveal sulci; facials nearer parafacies; arista with greater number of hairs, eight to eleven.

Psilopa (Psilopa) singaporensis (Kertesz)

1901. *Ephygrobia singaporensis* Kertesz, Termez. Fuztek., XXIV, p. 81. [Singapore.]
1913. *Psilopa singaporensis,* Hendel, Suppl. Entom., II, p. 97. [Formosa.]
1916. *Psilopa singaporensis,* Meijere, Tijds. v. Ent., LIX, p. 267. [Java.]
1924. *Psilopa singaporensis,* Becker, Entom. Mitt., XIII, p. 91. [Formosa.]
1925. *Psilopa singaporensis,* Cresson, Trans. Amer. Ent. Soc., LI, p. 245. [Philippine Islands, New Guinea.]

CEYLON: (W. Horn), [DEI, 2]. FRENCH INDO CHINA: Middle Annam, (Fruhstorfer), [Vienna, 1]. FORMOSA: Tainan, X, (H. Sauter), [HNM, 1].

Psilopa (Psilopa) rufipes Hendel

1913. *Psilopa rufipes* Hendel, Suppl. Entom., II, p. 97. [Formosa.]
1925. *Psilopa rufipes,* Cresson, Trans. Amer. Ent. Soc., LI, p. 244. [Philippine Islands, New Guinea.]

No additional records can be reported at present.

Psilopa (Psilopa) huttoni Hendel

1901. *Domina metallica* Hutton, Trans. N. Zeal. Inst., XXXIII, p. 90. [New Zealand.]
1926. *Psilopa metallica,* Tonnoir & Malloch, Rec. Cant. Mus., III, p. 12.
1931. *Psilopa huttoni* Hendel, Verh. Zool.-Bot. Gesells. Wien, LXXXI, p. 10. Renamed; not *Psilopa metallica* (Schiner), 1868.

I do not know this species.

Psilopa (Leptopsilopa) pollinosa (Kertesz)

1901. *Ephygrobia pollinosa* Kertesz, Termez. Fuzet, XXIV, p. 81. [Singapore.]

1913. *Psilopa pollinosa,* Hendel, Suppl. Entom., II, p. 97. [Formosa.]
1925. *Leptopsilopa pollinosa,* Cresson, Trans. Amer. Ent. Soc., LI, p. 251. [Ceylon, India, New Guinea, Australia, Samoa Islands.]

INDIA: Tondiarpet, Madras, VIII 13, (T. B. Fletcher; over open sewage), [IIE, 2]. SIAM: South West, Lampang, II 14, (Miss A. Mackei; at night), [IIE, 1]. FORMOSA: Polisha, XII (H. Sauter), [DEI, 5]. SAMOA ISLANDS: Santo Catalina, VII 2; Anuda, VII 15: (M. W. Williams, Templeton Crockett Exped.), [Cal. Acad. Sci., 3].

Psilopa (Leptopsilopa) mutabilis (Cresson)

1925. *Leptopsilopa mutabilis* Cresson, Trans. Amer. Ent. Soc., LI, p. 250. [Philippine Islands.]

This is an aberrant species, not fitting typically in any genus. However, our knowledge of the Oriental species of *Psilopa* is not sufficient to allow intelligent characterization of the species now placed therein. The present species has an ample face, well extended ventrad, entirely convex, not subcarinate, with well developed facial at mid profile. The ocellars are erect, diverging, situated between the posterior ocelli; the antennae are truly *Psilopa* like; fore tarsi are white basad, which is not typical of the present subgenus.

CEROPSILOPA

1917. *Ceropsilopa* Cresson, Entom. News, XXVIII, p. 340.
1925. *Pelex* Cresson, Trans. Amer. Ent. Soc., LI, p. 253.

Ceropsilopa purimana (Cresson)

1925. *Pelex purimana* Cresson, Trans. Amer. Ent. Soc., LI, p. 253. [Philippine Islands.]

Known only by the type from Manila. This is the genotype of *Pelex* Cresson, 1925, a genus which may be revived after more material is studied.

The present species has a broad, convex, not medianly gibbose face; antennae widely separated; fore tarsi entirely white.

Ceropsilopa tenuicornis Cresson

1925. *Ceropsilopa tenuicornis* Cresson, Trans. Amer. Ent. Soc., LI, p. 252. [Queensland.]

Known only by the type specimen from Brisbane. It appears to be a near relative to the above, with medianly gibbose face.

Ceropsilopa bidigitata (Cresson)

1916. *Psilopa longicornia* Meijere (not Lamb, 1912), Tijds. v. Entom., LIX, p. 266. [Java.]

1925. *Ceropsilopa bidigitata* Cresson, Trans. Amer. Ent. Soc., LI, p. 252. [Ceylon.]

I have no doubt but that my Ceylon species is the same as Meijere's *longicornia.* The legs are yellow except the fore tibia and tarsi, which are black. Face narrow, convex, not carinate and antennae are approximate.

Ceropsilopa decussata Cresson

1924. *Ceropsilopa decussata* Cresson, Trans. Amer. Ent. Soc., LI, p. 251. [Formosa.]

FORMOSA: Anping, V, (H. Sauter), [DEI, 3].

This species has the face narrow, subcarinate, niveous; legs entirely yellow.

RHYNCHOPSILOPA

1913. *Rhynchopsilopa* Hendel, Suppl. Entom., II, p. 96.

Rhynchopsilopa magnicornis Hendel

1913. *Rhynchopsilopa magnicornis* Hendel, Suppl. Entom., II, p. 96, figs. 3, 4. [Formosa.]

1922. *Rhynchopsilopa magnicornis,* Collin, Trans. Ent. Soc. London, 1921, p. 510.

1925. *Rhynchopsilopa magnicornis,* Cresson, Trans. Amer. Ent. Soc., LI, p. 251. [Formosa.]

1937. *Rhynchopsilopa magnicornis,* Cresson, Arb. Morph. u. Taxon. Ent., IV, p. 205.

FORMOSA: Krankau, VII, (H. Sauter), [DEI, 1].

Rhynchopsilopa rugosisculata de Meijere

1916. *Rhynchopsilopa rugosisculata* de Meijere, Tijds. v. Entom., LIX, p. 267. [Java.]

1922. *Rhynchopsilopa rugosisculata,* Collin, Trans. Ent. Soc. London, 1921, p. 510.

1937. *Rhynchopsilopa rugosisculata,* Cresson, Arb. Morph. u. Taxon. Ent., IV, p. 205.

Not recognized since originally described. Both Collin and Cresson noted differential characteristics as described.

Rhynchopsilopa ceylonensis Cresson

1937. *Rhynchopsilopa ceylonensis* Cresson, Arb. Morph. u. Taxon. Ent., IV, p. 205. [Ceylon.]

Not recorded since originally described.

Similar to *magnicornis* but lacks the thickening of the costa.

Tribe Discomyzini

1942. Discomyzini Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 104.

DISCOMYZA

1830. *Discomyza* Meigen, Syst. Beschr. Europ. Zweifl. Ins., VI, p. 176.

Discomyza maculipennis (Wiedemann)

1821. *Notiphila maculipennis* Wiedemann, Anal. Entom., p. 57. ["Inde Orient."]
1830. *Homalura maculipennis* Wiedemann, Aussereur. Zweifl. Ins., II, p. 574.
1867. *Discomyza pelagica* Frauenfeld, Verh. Z. Gesells. Wien., XVII, p. 451, pl. 12, fig. 13. [Nicobar Islands.]
1901. *Discomyza amabilis* Kertesz, Termez Fuzet., XXIV, p. 421, pl. 20, fig. 11. [Singapore.]
1908. *Discomyza maculipennis* Meijere, Tijds. v. Entom., LI, p. 166.
1925. *Discomyza maculipennis* Cresson, Trans. Amer. Ent. Soc., LI, p. 242. [Guam, Philippine Islands, Formosa, French Indo-China.]
1939. *Discomyza maculipennis* Cresson, Notulae Nat., no. 21, p. 4. [Admiralty Islands, Malay States, Solomon Islands, Fiji Islands.]

Siam: Ban Yao, S.E., VIII 29, (H. M. Smith), [USNM, 5]. New Hebrides: (C. Berg), 1944, [ANSP, 2].

A well distributed species in the Indo-Australian Region.

CLANONEURUM

1903. *Clanoneurum* Becker, Mitt. Zool. Mus. Berlin, II, p. 165.

Clanoneurum orientale Hendel

1913. *Clanoneurum orientale* Hendel, Suppl. Entom., II, p. 97, figs. 5, 6. [Formosa.]

This species is unknown to me.

Key to the Genera of the Indo-Australian Psilopinae

1. Setation usually very much reduced; postbucca bare, extensive, with posterior margin sharp and usually reflexed or marginated; facialia usually pitted or rugulose, the facials situated in such indentations; antennae always simple with arista sometimes bare (Tribe Gymnopini) 5

   Setation well developed (except in Discomyzini which has frons and face sculptured); if postbucca is extensive it is setulose and the posterior margin is not reflexed; facialia not noticeably sculptured (except in Discomyzini and the genus *Leptopsilopa*); facials may be situated on papillae but not in pits 2

2. Posterior notopleural distinctly removed dorsad from the notopleural suture, sometimes well into sutural angle; mostly opaque pruinose species (Tribe Atissini) 14

   Posterior notopleural at or near notopleural suture, horizontally aligned with anterior notopleural 3

3. Ocellars situated cephalad of line of anterior ocellus; antennae of the *Gymnopa* type; mostly opaque pruinose species (Tribe Discocerinini) 17

   Ocellars situated caudad of anterior ocellus, sometimes between posterior ocelli; antennae usually of the *Notiphila* type; mostly shining to polished species 4

4. Frons and face distinctly sculptured; three or more facials well removed from parafacies; setation weakly developed; mesonotal setulae not seriated (Tribe Discomyzini) 26

   Face and frons at most weakly sculptured; rarely two subequal facials which are usually near parafacies; setation well developed; mesonotal setulae usually distinctly seriated (Tribe Psilopini) 21

5. Arista bare or pubescent; alula broad 11

   Arista pectinate, with long hairs 6

6. Alula broad with pale cilia; face with subgibbose median prominence; antennae, halteres knob and base of tarsi pale; shining black species without vestiture ..... **Gymnopiella** Cresson

   Alula narrow with dark or without cilia 7

7. Scutellars without basal tubercles; fore femur normal, not greatly enlarged 9

   Scutellars arising from distinct apical tubercles 8

8. Fore femur greatly enlarged ..... **Stratiothyrea** Meijere

   Fore femur slender ..... **Hoploagis** Cresson

9. Face subhemispherically or subconically prominent medianly; scutellum scabrous, with approximate apicals; fore femur not greatly enlarged **Parathyroglossa** Hendel

   Face rather evenly convex or the convexity, if prominent, is transverse 10

10. Opaque to subopaque species; frontal decidedly lateroclinate; postbucca not marginated; vein II scarcely longer than III
Trimerogastra Hendel

Polished black species; frontal proclinate; postbucca marginated; vein II long, making costal section II at least twice as long as III
Athyroglossa Loew

11. Surface subopaque, more or less pruinose; face with longitudinal bare tubercle; postbucca not marginated .....**Placopsidella** Kertesz

Shining, sparsely pollinose species; face prominence round or subconical; postbucca marginated 12

12. Setation normal, well developed; frontal, ocellars and two notopleurals present .....**Chaetomosillus** Hendel

Setation reduced; no well developed frontal and but one notopleural ..13

13. Face including parafacies densely pitted, the median tubercle not distinct .....**Chlorichaeta** Becker

Face irregularly rugulose; face tubercle well developed
Gymnopa Fallen

14. Face without median shining tubercle; scutellum with four marginals .16

Face with median shining tubercle; scutellum with more than four marginal setae 15

15. Frons, in profile, convex; mesofrontal triangle setulose, with several marginal setae, but not the usual pair of ocellars; eyes round
Hecamede Haliday

Frons in profile more horizontal and flattened; mesofrontal triangle not conspicuously setulose, with usual pair of ocellars; eyes horizontally oval .....**Hemicyclops** Meijere

16. Frontals about aligned with ocellars, the latter cephalad of anterior ocellus; vein II long; costa II much longer than III; face most prominent well above epistoma .....**Allotrichoma** Becker

Frontals cephalad of line of ocellars, the latter caudad of line of anterior ocellus; face most prominent near epistoma, without median setae
Atissa Haliday

17. Facialia with a secondary series of dorso-laterally inclined seta laterad of the primary series; eyes pilose; notopleura setulose
Polytrichophora Cresson

No true secondary series, or at most only a suggestion of such as mesally inclined setulae 18

18. Notopleura bare with anterior notopleural well cephalad in the humeral angle 19

Notopleura setulose, with anterior notopleural caudad, nearer posterior one than to humeral; shining to dark species; parafacies relatively narrow; facial series of three or more primaries
Discocerina Macquart

19. Facialia with three or more subequal facials present; shining to polished species, the fore femur stout with distinct anterio-flexor comb of spinules .....**Pectinifer** Cresson

Facialia with only two subequal primary facials present.....20

20. Facials set very low, in profile below line of buccal orbits; head in profile flattened; face broad, the flattened, upper part without sharp interfoveal carina ..... **Hostis** Cresson
Upper facial, in profile, well above buccal line, about at mid-facial profile; head more elliptical in profile; face with distinct interfoveal carina ..... **Ditrichophora** Cresson
21. Supra-alar absent or minute 22
Supra-alar present and strong; wings with clear spots **Actocetor** Becker
22. Wings infuscated, with white or clear spots .... **Trypetomima** Meijere
Wings immaculate, or at most with clouds at vein tips and crossveins.. 23
23. Antenna I but slightly exserted; II more or less trigonal with stout anterior spine 25
Antenna I elongate, well exserted; II inversely conical, without stout (but may have curved hairlike) spine; III very long, sometimes attaining epistoma 24
24. Face long and narrow, flat or depressed, with sharp, prominent, epistoma; antenna III attaining epistoma ..... **Rhynchopsilopa** Hendel
Face convex or gibbose with retreating epistoma .. **Ceropsilopa** Cresson
25. Ocellars more or less parallel, situated cephalad of posterior ocelli; halteres white; frontalia well developed; face convex or gibbose medianly ..... **Psilopa** Fallen
Ocellars approximate, situated between posterior ocelli; face transversely prominent medianly ..... **Clasiopella** Hendel
26. Vein II running very close to costa and vein I, almost inseparable; wings immaculate or but slightly infumated; posterior crossvein with sharp angle ..... **Clanoneurum** Becker
Vein II normal; wings maculate; posterior crossvein normal **Discomyza** Meigen

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THE ORTHOPTERA OF THE APPALACHIAN MOUNTAINS IN THE VICINITY OF HOT SPRINGS, VIRGINIA, AND NOTES ON OTHER APPALACHIAN SPECIES AND RECENT EXTENSIONS OF THE KNOWN RANGE OF STILL OTHER SOUTHEASTERN SPECIES

BY MORGAN HEBARD

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High mountain valleys separated by ridges of comparatively regular contour, extending for the most part from northeast to southwest, form a large portion of the western margin of Virginia. At Hot Springs, Bath County, near the middle of that boundary, residence from July 3 to August 24, 1916, enabled me to secure a very large proportion of the species of Orthoptera there present and to study, in many cases, their habits, numerical abundance and date of adult appearance. Two thousand and eighty-nine specimens were secured, representing sixty-seven species. In addition I here discuss seven species and a race taken by others in this region, and ten other species and one race which will surely be found there eventually. This gives a total of eighty-six.

A dense but not lofty, largely deciduous forest, with oaks strongly predominant, covers much of the ridges about Hot Springs, clearings and the valleys being largely open pasture.

Efforts to investigate other types of environment were successful in locating an extensive tract of Canadian Zone vegetation along the highest part of the highest ridge (Bald Knob) where the mountain forest suddenly ceases at 3900 feet. The summit of Bald Knob is a gently convex area which rises to 4250 feet, covered by a very thick mat of dwarfed trees, oaks and conifers growing there only a foot or two high.

The other forested ridges showed little diversity, excepting Collison Ridge, where a greater amount of laurel and rhododendron undergrowth was present and four species were found which I did not see elsewhere, though particular efforts were made to find them.

Downward (to the south) from Hot Springs I found little change as far as I collected intensively, though a few areas of Pitch Pine at 1900 and 1700 feet had suggested that I might there be able to add a species or two.

I located no large swamps, the drainage being generally so decided that few if any sizable swamps or bogs were in the immediate vicinity.

One visit was made to Sounding Knob, the nearest high mountain (4400 feet) 27 miles north near Monterey, Highland County, and on the edges of the typical low mountain forest in pasture areas at or near the summit several species were added. Although so generally similar, that region shows a definitely more western influence. This is indicated by the presence there of *Melanoplus gracilis* and apparently the complete replacement of *Melanoplus mancus* by *Melanoplus islandicus*. Additional search should therefore be made in that region farther west for other western species.

Considering northern species, chiefly of the Canadian Zone, the known southern limits of five, *Camnula pellucida, Melanoplus mancus, Melanoplus fasciatus, Appalachia hebardi* and *Scudderia pistillata,* are found in the present area. A race of a boreal species, *Zubovskya glacialis amplicerca,* had been previously recorded only from the Allegheny Mountains at from 2100 to 4000 feet in Augusta County, Virginia, a short distance east of Highland County and northeast of Bath County.

Southern limits of other less boreal species, having a generally more northern distribution, are here found for *Melanoplus viridipes eurycercus, Scudderia texensis, Ceuthophilus brevipes* and *Ceuthophilus nigricans,* and southern and eastern limits of *Melanoplus gracilis* and *Melanoplus islandicus*. The only known Appalachian records of *Conocephalus strictus* and *Neoxabea bipunctata* are from this region.

In these Appalachian highlands at elevations of over 1700 feet are noted northern limits for the following six species having a

generally more temperate distribution: *Ischnoptera deropeltiformis* (Brunner), *Hippiscus ocelote* Saussure, *Schistocerca alutacea* (Harris), *Melanoplus tribulus* Morse, *Microcentrum retinerve* (Burmeister) and *Myrmecophila pergandei* Bruner. All except *Melanoplus tribulus* Morse have distributions reaching considerably further north, individually to different degrees, in the lower mountain areas and the lowlands.

Some of the material here discussed has already been reported by me or in cooperation with Rehn in revisionary studies, while Fox has recorded his collecting in the territory in 1914. Consequently the region is quite well known from an Orthopterist's point of view. A few other lowland species probably work up to the elevations studied than have yet been found there, a few additional very local species may be present and a very few additional southern Appalachian species may reach this far north, as the northern limits of a number of these are still poorly understood.

The following papers, which include important data on the Orthoptera of this region, have been published. Numerous other Virginia records are scattered through the literature, part in the series of studies on the Tettigoniidae by Rehn and Hebard, but few of those are of any importance in studying the region here under consideration.

Acrididae researches, Morse, *Carnegie Inst. Wash.,* Publ. 18, pp. 1–54, (1904); (new species described earlier that year, *Psyche,* XI, pp. 7–13).

North Carolina studies, Rehn and Hebard, *Proc. Acad. Nat. Sci. Phila.,* 1910, pp. 615–650, (1911).

Southeastern United States studies, Rehn and Hebard, *Proc. Acad. Nat. Sci. Phila.,* 1916, pp. 87–314, (1916).

Atlanticus revision, Rehn and Hebard, *Trans. Amer. Ent. Soc.,* XLII, pp. 33–99, (1916).

Virginia Field Notes, Fox, *Proc. U. S. Nat. Mus.,* LII, pp. 199–234, (1917).

Blattidae monograph, Hebard, *Mem. Amer. Ent. Soc.,* no. 2, pp. 1–284, (1917).

Myrmecophila revision, Hebard, *Trans. Amer. Ent. Soc.,* XLVI, pp. 91–111, (1920).

Wingina, Virginia and Vicinity records, Davis, *Jour. N. Y. Ent. Soc.,* XXXIV, pp. 27–41, (1926).

Gracilis, Viridipes and Tribulus Groups of Melanoplus, Hebard, *Trans. Amer. Ent. Soc.,* LX, pp. 337–362, (1935).

Ceuthophilus monograph, Hubbell, *Univ. of Fla., Biol. Sci. Ser.*, II, pp. 1–551, (1936).

Mancus Group of Melanoplus, Hebard, *Trans. Amer. Ent. Soc.*, LXIII, pp. 159–168, (1937).

Pennsylvania and adjacent data, Hebard, *Ent. News*, XLVI, pp. 219–225, 274–320, (1937), XLVII, pp. 33–38, 97–103, 155–159, (1938).

North Carolina list, Brimley, N. C. Dept. Agr., Div. of Ent., pp. 17–28, (1938).

Appalachia discussion, Rehn and Rehn, *Trans. Amer. Ent. Soc.*, LXV, pp. 92–95, (1939).

The locations given below were investigated by me and are noted in my note book by the numbers here indicated.

1. Monterey, 2800 ft.
2. Sounding Knob at 4400 to 3800 ft.
3. West base of Sounding Knob.
4. McDowell.
5. Flag Rock Pass at 2900 to 3000 ft., east of Warm Springs.
6. Flag Rock at 3200 to 3500 ft., Warm Springs Mountain ridge, south of 5.
7. Hot Springs, 2400 to 2900 ft. (up western slope of Warm Springs Mountain ridge).
8. Fassifern.
9. Deer Lick Mountain (ridge) 2800 to 3200 ft., west of 7.
10. Little Mountain (ridge) 2500 to 3200 ft., south of 9.
11. Collison Ridge, Switzerland Pass to summit. 2700 to 3000 ft., south of 10.
12. Falling Springs, 2000 ft.
13. Bald Knob, summit 3900 to 4200 ft., (Warm Springs Mountain ridge), south of 6 and southeast of 11.
14. West slope of 13, 2500 to 3900 ft.
15. Railroad below and southwest of Hot Springs at 1900 ft. (highest elevation for Pitch Pines).
16. Cedar Creek, 1700 ft., south of 15.

(1 to 4 Highland Co., 5 to 14 Bath Co., 15 and 16 Alleghany Co.)

Brief collecting was also done by me near Covington on August 16, to find what lowland species were present in the mountain valleys at the much lower elevations of 1200 and 1000 feet. The following, which I did not find anywhere higher up in these mountains, were located; *Schistocerca alutacea* (Harris) (though taken by Fox at Hot Springs), *Melanoplus scudderi* (Uhler) (moderately common in forest particularly near oak shoots, but immatures still much more numerous than adults), *Orchelimum minor* Bruner (heard but not taken, up in small Pitch Pines), *Conocephalus*

saltans (Scudder), *Nemobius c. cubensis* Saussure (considerable colony in lush grasses in stream near woods at 1300 feet), *Nemobius confusus* Blatchley (few in damp leaves under rather thick forest at 1200 feet) and *Anaxipha exigua* (Say) (two seen, one taken but mashed). A number of others could almost surely have been located, had the then bad roads not prevented further visits.

Endemic Species of the Southern Appalachians

In the Appalachian Mountains some 55 miles southwest of the region about Hot Springs is found the first more southern mountain endemic, *Melanoplus acrophilus pachycercus* Hebard, as yet known only from Mountain Lake, Giles County, Virginia, at 4000 feet.

Much further south ten other Appalachian endemics are known; *Diapheromera carolina* Scudder, *Melanoplus longicornis* (Saussure), *Melanoplus acrophilus acrophilus* Hebard, *Melanoplus deceptus* Morse, *Melanoplus cherokee* Hebard, *Melanoplus tribuloides* Morse, *Melanoplus serrulatus* Hebard, *Melanoplus divergens* Morse, *Conocephalus allardi* (Caudell) and *Atlanticus monticola* Davis. In that much richer region many other species are of course present, reaching there from the southern lowlands. A considerable number of these extend their distribution northward, but in the lowlands only, to the east, or west, of the Hot Springs region, or both.

Recently Published Extensions of Distribution

In recent years the known distribution of a number of eastern species has been considerably extended, in some cases showing a closer approach of the species in question to the Hot Springs region, both from the north and from the south.

The most noteworthy of these are the following.

Extension of distribution southward

Stethophyma platyptera Scudder. Lane, South Carolina.
Orchelimum gladiator Bruner. New Castle, Delaware.
Orchelimum superbum Rehn and Hebard. Southport, North Carolina.

Extension of distribution northward

Parcoblatta fulvescens (Saussure and Zehntner). Lakehurst, New Jersey.[1]

Parcoblatta caudelli Hebard. Wading River on Long Island, New York.

Parcoblatta lata (Brunner). Ocean View, New Jersey, and Clinchfield, Russell County, Virginia, at 1950 feet.[2]

Parcoblatta divisa (Saussure and Zehntner). Anglesea, New Jersey; Swarthmore, Pennsylvania, and Clinchfield, Russell County, Virginia, at 1950 feet.[3]

Brunneria borealis Scudder. Washington and Raleigh, North Carolina.

Anisomorpha ferruginea (Beauvois). Past confusion with *A. buprestoides* has made definition of the correct limits of distribution of this insect impossible. After study of all available material, I have found the "Virginia" record originally given probably limitable to the lowlands of the southeastern part of the State, *buprestoides* being an optimum, closely related species or race limited to southeastern Georgia and peninsular Florida.

More exact northern limits are therefore Hurdle Mills, (north-central) North Carolina; Wilson's Gap near Mountain City, Georgia; Jackson and Posey Counties, Indiana, and Saratoga, Illinois. Southern limits are Sandfly, Albany and Thomasville, Georgia, and Carrabelle, Florida, westward on the Gulf Coast.

Neotettix proavus Rehn and Hebard. Raleigh (and originally) Murphy, North Carolina, and Weston, Bell County, Kentucky, at 1050 feet.[4]

Tettigidea acuta Morse. Morgan, N. J.

Amblytropidia occidentalis (Saussure). Gilmerton and Deans, Virginia.

Melanoplus impudicus Scudder. Seldom on Long Island, New York.

Melanoplus angustipennis impiger Scudder. Southern Pines, North Carolina.

Inscudderia walkeri Hebard. Cape Henry, Virginia. Caudell's variety *buscki* from this locality is a synonym based on very depauperate material such as is sometimes found at or near the extreme northern limit of a species distribution.[5]

Montezumina modesta Brunner. Wingina, Virginia.

Belocephalus subapterus subapterus Scudder. Lakeview, North Carolina.

Pyrgocorypha uncinata Harris. Roanoke Island,[6] Rocky Mount, Raleigh

Neoconocephalus velox Rehn and Hebard. Raleigh, North Carolina.

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[1] Prior Long Island records apply to *caudelli*.

[2] August 1, 1939, (Rehn and Rehn), 1 ♀, [A.N.S.P.], (first recorded here). A northern limit in the Appalachian Mountains.

[3] August 1, 1939, (Rehn and Rehn), 1 ♀, [A.N.S.P.], (first recorded here). A northern limit in the Appalachian Mountains.

[4] August 3, 1939, (Rehn and Rehn), 1 ♂, [A.N.S.P.], (first recorded here).

[5] Similar is the record of a very small male of *Orchelimum militare* from Speedwell, New Jersey. The very great distance to nearest other known points in the distribution of these species is difficult to understand, considering how much our knowledge of the Orthoptera of the regions concerned has been improved.

[6] Eleven males before me were taken April 15, 1938, by H. R. Roberts. and Tryon, North Carolina.

Orchelimum militare Rehn and Hebard. Speedwell, New Jersey.
Conocephalus aigialus Rehn and Hebard. Cape May, New Jersey.
Miogryllus verticalis (Serville). Staten Island, New York; Philadelphia, Lancaster and Abbottstown, Pennsylvania.[7]
Nemobius sparsalsus Fulton. Ocean View and Claremont, New Jersey.
Cycloptilum bidens Hebard. Marion on Long Island, New York.

DERMAPTERA

Labiidae

Labiinae

Labia minor (Linnaeus)

One specimen was taken by me on the wind-shield of an automobile near Hot Springs. It is an established adventive.

ORTHOPTERA

Blattidae

In my revision of the North American Blattidae [8] I included all of the material of the following species, so that it is unnecessary to repeat the data there given.

Pseudomopinae

Blattella germanica (Linnaeus)

Established adventive.

Ischnoptera deropeltiformis (Brunner)

Collison Ridge at 2800 feet. A northern limit in the Appalachian Mountains at this elevation. Pair only, seen and taken.

Parcoblatta virginica (Brunner)

Parcoblatta uhleriana (Saussure)

Parcoblatta pensylvanica (De Geer) [9]

Panesthiinae

Cryptocercus punctulatus Scudder

At 2400 to 4000 (near summit of Bald Knob) and 4400 feet (summit of Sounding Knob). Not difficult to locate, probably

[7] July 4, 1936, (Rehn and Rehn), 4 ♂, 3 ♀, 4 large to very small juvs, [A.N.S.P.].
[8] Mem. Amer. Ent. Soc., No. 2, pp. 1 to 284, (1917).
[9] At elevations of 2000 feet and higher the region is apparently too far north for *P. bolliana, fulvescens, caudelli* and *lata.*

due partly to great numbers of partially decayed chestnut logs in forests, following death of all such trees from chestnut blight. Found only once in two pine logs, there quite numerous in decaying sap wood.

Phasmidae

Heteronemiinae

Diapheromera femorata (Say)

A few taken, the first adults on July 14. Found up to 4000 feet on Sounding Knob and 3900 feet on Bald Knob.

Acrididae

Tetriginae

Nomotittix cristatus cristatus (Scudder)

One in pasture on Sounding Knob at 4200 feet and few 1700 feet, up to pasture on edge of bald on Bald Knob at 3900 feet.

Tetrix acadicus acadicus (Scudder) [10]

Very general but in small numbers in forest undergrowth, there up to 3900 feet on Bald Knob. In great numbers locally only in short grass of hillside on golf course above Hot Springs at 2800 feet.

Tetrix ornatus Say

Few, only in short grass at Hot Springs at 2800 feet and on Collision Ridge in short grass of open spot at 2700 feet.

Tetrix arenosus angustus (Hancock)

Few, usually on damp spots on forest trails at Hot Springs, Healing Springs and on Little Mountain at 3200 feet .

Neotettix femoratus (Scudder)

Scarce but very widely distributed. One at 4245 feet, in summit bald of Bald Knob. Four caudate in series collected.

Tettigidea lateralis lateralis (Say)

Moderately common, majority abbreviate phase.

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[10] The boreal *Tetrix subulatus* (Linnaeus) (long recorded in America as *Acrydium granulatum* Kirby) has been reported from the Appalachian Mountains only as far south as Tobyhanna, Pennsylvania, though in the marshes and bogs of the lowlands it is known from as far south as Tinicum Island, Pennsylvania, and Hancock's Bridge, New Jersey. Sherman's 1911 record from the mountains of North Carolina was based on material of *acadicus acadicus*.

Acridinae

As *Eritettix simplex simplex* Scudder is locally abundant in grasslands of poor soil in the southern Appalachians and northeast in the lowlands as far as Southing, Connecticut, and has been reported from Virginia as high as 1600 feet at Bells Valley, it may be present in the Hot Springs region. Adults appear so early in the season that they should be sought there particularly in late May and early June.

Orphulella speciosa (Scudder)

Common, appearing adult in mid-July.

Chloealtis conspersa Harris

In small numbers but generally distributed, and up to 4400 feet on Sounding Knob. Immatures more numerous than adults when I arrived early in July.

Chorthippus longicornis (Latreille)

Seldom present. One in high grass of valley meadow at Fassifern. Few at 4200 feet but common in thick luxuriant grass at 3800 feet on Sounding Knob.

Oedipodinae

Arphia sulphurea (Fabricius)

In forest undergrowth generally. Adults moderately common early in July, soon much scarcer and very few tattered survivors to be found as late as August 21.

Arphia xanthoptera (Burmeister)

I found immatures on a slaty hillside at Fassifern on August 3. Fox reported adults present though not abundant through the region a month later in the season.

Chortophaga viridifasciata (De Geer)

Generally common in mountain meadows. During a brief earlier visit to Hot Springs I took a recently emerged pair on May 7.

Encoptolophus sordidus sordidus (Burmeister)

Several colonies of immatures found but first adult taken August 12.

Camnula pellucida (Scudder)

Moderately abundant but all battered on August 20 in drier short grasses of open pasture at 4200 feet on Sounding Knob. This southernmost limit reported by Fox in 1917.

Hippiscus ocelote Saussure

An immature taken on a slaty hillside at Fassifern on August 3. Adults reported common locally at Hot Springs a month later by Fox in 1917, when he gave localities in Highland County, northern limits in the Appalachian Mountains at over 2000 feet.

Pardalophora apiculata (Harris)

An immature of this extremely widely distributed, but often very local, northern species was reported from Monterey by Fox in 1917. The Appalachian Mountains carry its distribution far south, as it has been recorded in them to Asheville, North Carolina, though it is not known from the eastern lowlands south of Woodstock, Virginia.

Pardalophora phoenicoptera (Burmeister)

This widespread southern species should be present in this region as it has been recorded as far north in the mountains as Jarman's Gap, Virginia, in the Blue Ridge at 2500 feet. On the coast it is known north to Fort Wadsworth on Staten Island, New York.

Dissosteira carolina (Linnaeus)

Adults of this conspicuous and very generally distributed roadside species were not seen by me until July 14.

Spharagemon planum Morse

Hoping to obtain a series of this species, it was surprising that I did not locate a single specimen although I found *S. bolli* at a dozen different locations. In 1917 Fox reported *planum* from the crest of the Blue Ridge at 2500 feet and from Monterey as *saxatile planum* (*saxatile* now known to be an amply distinct more northern species). During a brief visit in 1939 Rehn and Rehn took five specimens on bare rock fragments beside the then graded road at Flag Rock Pass on Warm Springs Mountain at 2900 feet and eight miles north of Covington at 2350 and also found it near

Wytheville (type locality), [material in A.N.S.P.], while E. S. Thomas has found it locally quite numerous in eastern Ohio.

I can now say that *planum* is very local, often limited to bare areas of rock fragments but there frequently numerous, appearing adult rather late in the season, while *bolli* is much more generally distributed, definitely more sylvan and earlier appearing.

Spharagemon bolli bolli Scudder

Very generally distributed and common, in and on the margins of woodlands, the first adults to appear were taken July 5. Present on summits of both Sounding Knob and Bald Knob.

Cyrtacanthacrinae

Since *Schistocerca a. americana* (Drury) and *S. d. damnifica* (Saussure) are known to develop an unusual restlessness in the late Fall, individuals of the former particularly then sometimes found much beyond its normal range northward, both species might well be sought in the present region at that time of year. Neither, however, are normally present as high as 2000 feet in the mountains this far north.

Schistocerca alutacea (Harris)

Though Fox found a male of this species at Hot Springs on September 5, I located only a male and immatures at 1500 feet, above Covington, on August 15. It is probably quite scarce in the present region, appearing adult late in the season.

Paratylotropidia beutenmülleri Morse

Rehn and Rehn, who recently completed a revision of the genus, state that this distinctive species is peculiar to the Appalachian Mountains, whence they have reported material from South Carolina to Virginia north of the Hot Springs region. It will, therefore, eventually almost certainly be found here. Its occurrence in apparently very restricted and widely separated spots has made it one of our most difficult grasshoppers to locate.

Melanoplus gracilis (Bruner)

Material which I determined was recorded by Fox in 1917, who had found this more western species at Monterey "in fair numbers in an open marsh overgrown with rank herbage" on

August 22, 1914. I located a pair in a sheep pasture near tall clumps of *Eupatorium urticaefolium* L. on Sounding Knob at 4200 feet on August 21, 1916, an eastern limit.

Melanoplus viridipes eurycercus Hebard

A pair from the present collection of this very widespread but local eastern race of a mid-western species was recorded originally by me in 1920. I found these on the summit of a spur of Sounding Knob at 3800 feet on August 21, 1916, in the mountain forest, the male in laurel, the female in thick luxuriant grass.[11] The insect is probably present locally in all parts of the Virginia mountains showing western influence, appearing adult in May.

Melanoplus similis Morse

My *calloplus* 1920, synonymized by me in 1935, was based on eleven adults taken at 3200 feet on Collison Ridge on July 5 and 8, 1916. The series represented nearly all of a single colony I found in huckleberry, laurel and other bushes of the dense deciduous mountain forest undergrowth. Though often sought, only a single small immature was found, at the same place on August 8.

The species is thamnophilous, extremely local and does not occur nearly as far north or west as *viridipes eurycercus,* though probably inhabiting a similar portion of the Virginia Mountains, where it has been found adult as early in the season as late May.

Melanoplus hubbelli Hebard

This species should also be locally present, though not yet found, in the Hot Springs region as I originally recorded it east to the Catoctin Mountains, Maryland; Bluemont, (near the Blue Ridge Mountains of northern) Virginia; west to Vigo County, Indiana, and also from a number of localities in the southern Appalachians.

I am informed by E. S. Thomas that in Ohio it appears adult as early as late May, prefers the undergrowth of second growth woodlands on hill slopes with xeric exposure and is much more sluggish and easy to capture than the very alert *similis.*

[11] Through some slip I also so recorded the pair of the preceding species here correctly reported.

Melanoplus delaware Hebard

A few were taken in forest undergrowth near Covington at 1300 feet, on shaly hill below Hot Springs at 1800 feet and on Deer Lick Mountain at 2800 feet. A very large series, however, was obtained in Flag Rock Pass at 2900 feet from an exceptionally large colony in a hillside pasture, located July 4 and revisited several times.

Melanoplus tribulus Morse

First found adult by me at Switzerland Pass at 3200 feet on August 23, when even so late in the season the majority of the single colony located in the region where immature. These were in laurel and huckleberry bushes and on the ground. Reported as *devius* from Bolar, by Fox in 1917 [12] and from Wingina, also a northern limit, by Davis in 1926.

As *Melanoplus decoratus* Morse is another species always found very locally and usually less often in more widely separated colonies in forest undergrowth, persistent intensive search may reveal its presence in the Hot Springs region. At present it is known from High Rocks near Wytheville, Virginia, at 3000 to 3500 feet, but in the lowlands northeast on Southwest Mountain at Orange, Virginia, northwest to Knox County, Ohio, and as far south as Macon, Georgia.

Melanoplus mancus (Smith)

Everywhere through the forest undergrowth, often the most abundant grasshopper, occasionally even in low bushes there. Greatest numbers present in low rich grasses on Bald Knob at 3900 feet bordering summit bald (where only one immature was taken). Adults yet present only in moderate numbers in early July. Covington, Virginia, at 1200 feet is a southern limit for *mancus,* (which Fox recorded in 1917 on my authority from Hot Springs as *celatus* and I corrected in 1937).[13]

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[12] On my determination, a name placed by me under *tribulus* in 1935. Previously *delaware* had been repeatedly recorded as *tribulus* and *tribulus* as *devius.*

[13] When the aedaegi of the Mancus Group were first studied, completely eliminating prior great difficulty in determining its component species.

Melanoplus islandicus (Blatchley)

Recorded by Fox from Monterey in 1917 as *celatus* on my authority in 1917 which I corrected in 1937, then also recording the three specimens I took on Sounding Knob at 4200 to 4300 feet, a southeastern limit.

In that area *islandicus* was "in considerable numbers in two or three restricted spots, but in most places it was lacking or very scarce. All were taken in grassy or shrubby undergrowth in or close to open deciduous woods on mountain slopes." It there supplants *mancus,* as is the case in the Appalachians of western Pennsylvania.

Melanoplus walshii Scudder

Widespread but local and not numerous in forest undergrowth, sometimes up in bushes, at 3000 feet upward on summits of ridges and upper mountain slopes to their tops. On Sounding Knob in summit pasture near tall clumps of *Eupatorium urticaefolium* L. First adult taken July 5 but small immatures found as late as August 14.

Although always very local and difficult to find, the northern *Melanoplus punctulatus punctulatus* Scudder has been taken as far south in the lowlands as Raleigh and Blantyne, North Carolina, and higher at Thompson's Mills, Georgia, it is almost certainly present in the Hot Springs region. Arboreal, the race prefers conifers and particularly White Pines. It appears adult late in the season.

Melanoplus bivittatus (Say)

A common species, generally distributed. Taken as high as 4400 feet in summit pasture on Sounding Knob. An adult male secured as early as July 4, when great majority of the species were still immature.

Melanoplus confusus Scudder

In short rich green grasses and clover, found by me moderately abundant in open spots on Sounding Knob at 4200 to 4300 feet on August 21, elsewhere only in ones and twos only at McDowell (in swampy spot), near summit of Collison Ridge and on Bald

Knob from 3900 feet into bald of summit. Adults undoubtedly much more numerous and generally present prior to my arrival in early July, but always very local.

Melanoplus femur-rubrum femur-rubrum (De Geer)

This widely distributed and usually very common species was, in this region, seldom seen by me, but present from Covington at 1200 feet up to 4400 feet on Sounding Knob.

Melanoplus impudicus Scudder

The present insect, peculiar to "pine barren" environment, was fully discussed by Gurney in 1941, at which time he recorded a male from the small series I found at Hot Springs at 1900 feet in an area of Pitch Pines on July 6th.

Melanoplus fasciatus (F. Walker)

Widespread but not common in huckleberry bushes and other low undergrowth of forest. First adults late in July. This is a southern limit for this very widespread boreal species.

Melanoplus mexicanus mexicanus (Saussure)

Generally distributed in open and up to summits of both Bald and Sounding Knobs (highest 4400 feet); numerous in pasture on latter at 4200 feet only.

Melanoplus keeleri luridus (Dodge)

Few in woods undergrowth from Covington at 1200 to Hot Springs at 2400 feet. First adults present August 7th.

Appalachia hebardi Rehn and Rehn

A female from Sounding Knob was recorded as *Dendrotettix australis* (Fox) by Fox in 1917 on Hebard's authority. This was corrected by Rehn and Rehn in 1936 who also recorded two males which I took at 3900 feet on Bald Knob on August 14 and 19. These constitute a southern limit of distribution. I found them only after close and long search in the forest bordering the summit bald among the huckelberry bushes and hazel and oak shoots. Their color harmonized best with the oak bark. Individuals are deliberate but leap vigorously. The species is more thamnophilous than dendrophilus.

Zubovskya glacialis amplicerca (Caudell and Allard)

I took fifty adults and eleven immatures from 3800 to 4250 feet on Bald Knob, the adults on August 14 and 19. It was there locally distributed through the bushes of the upper forest and over the bald and particularly abundant in small colonies in shallow depressions on the bald where the waist-high hazel, oak, laurel and rhododendron thicket grows densely. A high percentage of the individuals seen can be captured as the males leap deliberately usually for the higher portions of adjacent bushes and the leaf upper surfaces while the females though even more sluggish often slip down into more inaccessable places. I also took four immatures in the forest undergrowth on Collison Ridge at 3200 feet on July 5 and 8.

The race is further known only from the Virginia Appalachians a short distance to the northeast on Big Bald Knob and Little Bald Knob at from 2100 to 4000 feet.

The race *Zubovskya glacialis variegata* (Scudder) may be present locally in the region about Hot Springs, as it has been reported from both the Blue Ridge and the Allegheny Mountains to the north and from a number of localities high in the Appalacians to the south.

Tettigoniidae

Phaneropterinae

Scudderia septentrionalis (Serville)

First heard in trees on July 21. I captured twenty-six males of this comparatively rare species at Hot Springs, attracted to light at night, from August 2 to 22. Heard in tops of oak trees oftenest just after dark and hardly ever after 11 P.M. The song consists of a few irregular clicks accompanied by a low prolonged buzzing "zzzzzzz-kick-ik-cick-ik-ik-zzzzz." On favorable evenings one to four would be attracted to the powerful light on my porch but these were always restless, fluttering back into the tree tops very soon unless captured.

A southern limit in the Appalachians is Mt. Sterling, N. C. (Brimley, 1938).

Scudderia pistillata Brunner

Specimens from Monterey at 4000 feet and Bolar, Va., were recorded by Fox on Rehn and Hebard's authority in 1917. These are southern limits. I did not see the species in this region.

Scudderia curvicauda curvicauda (De Geer)

Through forest undergrowth, particularly among oak shoots, adults common late in August.

Scudderia texensis Saussure and Pictet

Recorded from Bolar, Va., at 2200 feet by Fox in 1917, a northern limit in the Appalachians and not seen by me.

Scudderia furcata furcata Brunner

The first adult of this common katydid was taken on August 12. The song a sharp single "ziiik" louder and harsher than this portion of the song of *S. septentrionalis*.

Scudderia fasciata Beutenmüller

Not seen by me, but one female taken beside road in low undergrowth of deciduous forest on Flag Rock Pass at about 2950 feet, on September 8, 1939, by Rehn and Rehn [A.N.S.P.].

Cashiers, Jackson County, North Carolina, at 3500 feet is a southern limit, where a female was taken on edge of a sphagnum patch in the deciduous forest by Rehn and Rehn on September 5, 1939, [A.N.S.P.].

Amblycorypha rotundifolia Scudder

Present generally and relatively very common. Prefers forest undergrowth. First adults taken July 26. Song at night not loud, a rustling "tick-a-tick-a-tick-a-tick-a-tick-a," a great rapidity and sometimes prolonged. Late at night occasional individuals give a decidedly louder and harsher note, not as but still very rapid.

Recent studies by the author show that *parvipennis* still is a mid-western species, not a race of *rotundifolia* as was indicated by Rehn and Hebard in 1914 and 1916. The southeastern specimens then considered intermediates are actually somewhat aberrant from typical *rotundifolia* but not at all like the very distinct *parvipennis*.

Microcentrum retinerve (Burmeister)

I found a small immature in the undergrowth of the forest at 3100 feet on Deer Lick Mountain on July 10. This is a northern limit in the Appalachians.

Microcentrum rhombifolium (Saussure)

This very widespread species will almost surely be found in the Hot Springs region.

Pseudophyllinae

Pterophylla camellifolia camellifolia (Fabricius)

This interesting species is generally distributed and comparatively common in the oaks of the mountain forest of this region. The first adult was heard singing August 2. I recorded and discussed my series in 1941.

Copiphorinae

Neoconocephalus ensiger (Harris)

Very occasional in this region, its song a rapid and not very loud "dzz-dzz-dzz-dzz." As I have noted in New England, males when singing are not at all wary.

The species has been recorded south to Blowing Rock, North Carolina.

Conocephalinae

Orchelimum vulgare Harris

Moderately common, the first adults seen August 3.

Conocephalus fasciatus fasciatus (De Geer)

This common species was present throughout this region, up to 4200 feet on Sounding Knob. One male came to light at night on August 6.

Conocephalus brevipennis (Scudder)

Common throughout this region.

Conocephalus strictus (Scudder)

Recorded from Bolar, Monterey and Hot Springs by Fox in 1917. Previously not known from the Appalachians, not seen by me.

Decticinae

Atlanticus davisi Rehn and Hebard

Moderately common through the forest undergrowth down to Covington at 1200 and up to summit of Sounding Knob at 4400 feet. Prefers patches of dead leaves where immatures outnumbered adults as late as July 3.

It is probable that this species is supplanted by *A. monticola* Davis in the Appalachians south of Washington County, Virginia.

Rhaphidophorinae

Hadenoecus puteanus Scudder

Much the most abundant species of the Centhophili in this region though hardly ever seen except at night on boulder walls or nearby on trunks of trees baited with molasses. Apparently seldom present in the oak forests where *Centhophilus gracilipes* and *pallidipes* are generally distributed and the latter very abundant.

Almost all seen after August 1st were adult. They climb about with legs straddled out suggesting great harvest spiders. Though nimble they showed little fear when approached and even after being sufficiently frightened to spring down onto the grass they could usually be easily picked up. When moving about they keep their exceedingly long antennae in constant motion.

The majority of my very large series was taken at Hot Springs at 2400 feet, a few on Flag Rock Pass at 2900 feet.

Centhophilus brevipes Scudder

Found by me only in summit pasture on Sounding Knob at 4400 feet on August 21. Recorded by Hubbell in his monograph, as well as the others of this genus which I secured.

Centhophilus gracilipes gracilipes Haldeman

Numerous throughout this region.

Centhophilus pallidipes Walker

The most numerous species of *Ceuthophilus* throughout this region. Much the oftenest found in small colonies in dead logs and stumps.

Centhophilus nigricans Scudder

Eleven taken at Hot Springs at 2400 feet in ones and twos, attracted to molasses on tree trunks. Much the scarcest species of the genus here at this southern limit. The shorter antennae and limbs and more robust body give a *Phrixocnemis*-like appearance to this also definitely more terrestrial species.

Gryllidae

Gryllinae

Gryllulus assimilis (Fabricius)

Found by me on Collison Ridge and on summit of Sounding Knob at 4400 feet.

Nemobiinae

Nemobius fasciatus fasciatus (de Geer)

Present throughout this region and in great numbers in summit pasture of Sounding Knob at 4400 feet. First adult taken August 2.

Nemobius carolinus carolinus Scudder

A few noted in undergrowth of open forest at Hot Springs. A few also found in summit pasture of Sounding Knob at 4400 feet.

Oecanthinae

Oecanthus exclamationis Davis

Not found as yet in this region but I have a female from Walnut, North Carolina, and Rehn and Rehn took specimens now in the collection of the Academy of National Sciences of Philadelphia at McAfees in Craig County and the Catawba Ridge at 2000 feet in Virginia.

Oecanthus angustipennis Fitch

Only two immatures taken, on trunk of oak at night baited with molasses by me at Hot Springs. Three adults and one immature were secured on September 8, 1939, by Rehn and Rehn on Flag Rock Pass [A.N.S.P.].

Oecanthus niveus (de Geer)

Immatures of this species of *Oecanthus* the most frequently found in the oak and hazel undergrowth of this region. A female taken on September 8, 1939, by Rehn and Rehn on Flag Rock Pass [A.N.S.P.].

Oecanthus nigricornis quadripunctatus Beutenmüller

One taken in bald of ridge at Flag Rock at 3500 feet.

Oecanthus nigricornis nigricornis F. Walker

Recorded from Monterey by Fox in 1917. Not seen by me in this region.

Oecanthus latipennis Riley

Occasional on Little Mountain at 3200 feet in oak scrub forest undergrowth, also in similar environment on Deer Lick Mountain and on Flag Rock Pass.

Neoxabea bipunctata (de Geer)

One adult taken at Hot Springs, on August 24. After dark on trunk of tree baited with molasses. A northern limit in the Appalachians.

MYRMECOPHILINAE

Myrmecophila pergandei Bruner

One large immature female taken by me at Hot Springs at 2500 feet in mountain forest, under decaying chestnut log in nest of ant *Formica fusca* var. *subsericea*.[14]

Recorded by me in 1920. A northern limit in the Appalachians.

GRYLLOTALPINAE

Gryllotalpa hexadactyla Perty

A few heard singing along drains in open at Hot Springs at 2400 feet but I could not locate a single specimen.

[14] Determined by Prof. W. M. Wheeler.

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PLATOECETICUS PACKARD, AND A REMARKABLE NEW SPECIES OF THE GENUS

(LEPIDOPTERA: PSYCHIDAE)

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(Plates III, IV, V, VI and five text-figures)

This paper discusses *Platoeceticus* Packard and the one earlier genus (*Cryptothelea* Duncan) with which it may be in conflict in the world-literature of the *Psychidae*. It amplifies the original and later characterizations of *Platoeceticus,* and as thus re-defined, recognizes the inclusion of only five names (one new) of specific rank, as that genus is represented in North America and the West Indies. By text, and by illustrations including numerous reproductions of photomicrographs of male structures, it aims to make readily possible the recognition of this genus and its included species.

Though this paper embodies the results of past examination of material in many other collections, it is chiefly based upon specimens in the collection of the author, which now includes eighty-two pinned males and one hundred twenty-one micro-slide preparations from these and from twenty-one additional specimens of the genus, together with long series of larval sacks, preparations in fluid, and extensive comparative material of other genera.

The genus *Platoeceticus* was created by A. S. Packard in 1869 [1] for the reception of an insect which he designated *"Platoeceticus Gloverii."* Packard had not then seen the insect, but he stated that "we give the following account of it from the study of his" (Glover's) "admirable drawings." His text-description is naturally couched in general terms and supplies little basis for either generic or specific recognition; but his figures representing male and female adults, the larva, and a sack suspended for pupation, especially when these are considered in connection with Glover's

[1] Guide to the Study of Insects, pp. 291–292, fig. 223.

previously published reference [2] to this insect (without however naming it), leave little occasion for doubt regarding the species intended. Attempts to locate the specimens from which Glover's drawings were made [3] have been unsuccessful, at Cambridge, Boston and Washington.

Though the insect received further treatment in the literature of economic entomology, notably by Comstock [4] and by Ashmead [5] in 1880, by Hubbard [6] in 1885, no attempt at fuller generic characterization was published until 1887, when Packard,[7] having received several Florida specimens from Hubbard, made comparison of *gloverii* with *"Psyche" confederata* Grt., an insect of similar size and general appearance. For most families of the Lepidoptera, this later characterization of *Platoeceticus* and of its (then) only recognized species would have been fairly satisfactory; but in the *Psychidae* several factors combine to render the definition and recognition of either genera or species uniquely difficult: usually, representatives of only one sex, the male, have been available or used in identification and original description; the prevalent lack of color-pattern results in superficial resemblances, even among species not closely related; within the species, wide individual variation of some structural characters has been a frequent source of confusion and error, for its significance cannot be appreciated and weighed until series of specimens have been studied, and even wing-venation, unfortunately the character most relied upon by some authors, is so variable among the Psychids that if the much-employed family and generic keys are followed too implicitly, an individual specimen may present the anomaly of belonging to one family or genus by its right-hand wings, to a different family or genus by its left; the number of antennal joints is not rigid; in those species possessing an anterior tibial spur (epiphysis), the length of the spur is widely variable, with resulting confusion of species; and in this family, individual variability and close interspecific similarity are both exhibited by the male genitalia, and

[2] Rpt. U. S. Com. Patents for 1858, vol. Agric., p. 264, (1859).
[3] See Barnes & Benj., Contr. Nat. Hist. Lep. No. Amer., v, 3, p. 188, 1924.
[4] Rpt. U. S. Ent., pp. 251–252.
[5] Orange Insects, p. 51.
[6] Spec. Rpt., Dept. of Agric., Insects affecting the orange, pp. 69, 148–149, fig. 67.
[7] Ent. Amer., III, pp. 51–52.

the abdominal plates. Under these conditions and with the increasing multiplicity of (supposed) genera and species in the literature of the *Psychidae,* it is not surprising that both synonyms and incongruous associations prevail, in that literature, or that *Platoeceticus* shares in that confusion.

This generic name is not invalid by preoccupation; but does it create a generic synonym? Fortunately, an answer to this question is facilitated by the fact that *Platoeceticus* (1869), though antedated by some of Walker's numerous Psychid genera, has time-precedence over the multitude of such genera created by Moore, Heylaerts, Hampson and others, a few decades later. After a rather careful search of the earlier literature, only thirty-five generic names have been found, antecedent to 1869 and intended by their describers to apply to representatives of the "higher" [8] Psychids. A scrutiny of these names and of their later literature, supplemented in doubtful instances by reference to the insects involved, reveals only one of these earlier genera which seems to endanger the validity of *Platoeceticus;* and that one is *Cryptothelea* Duncan, a genus later exhibiting an almost incredible record of discrepancies in application, in part as follows:

In 1827 Lansdown Guilding, a resident of the island of St. Vincent, created the genus *Oiketicus* [9] for the reception of two insects which he named respectively *O. kirbyi* and *O. macleayi.* His text specifically states the generic habitat to be "Regio. India Occidentalis," and throughout implies a personal field-acquaintance with the two species; nevertheless, a confusion arose and has persisted with reference to the habitat and consequent identity of Guilding's second species, *macleayi,* which may directly involve the status of *Platoeceticus.* In 1841. Duncan [10] recognizing that *macleayi* could not properly be associated generically with *kirbyi,* the designated type of *Oiketicus,* proposed for its reception a new genus, *Cryptothelea,* basing the name entirely on Guilding's text and illustrations. In 1854 Westwood,[11] stating that "Of the male

[8] Roughly, those having grub-like wingless females, destitute of functional eyes, legs and antennae.
[9] Trans. Linn. Soc. Lond., xv, pp. 371–377, pls. 6, 7 and 8.
[10] Exotic Moths, p. 115.
[11] Proc. Zool. Soc. Lond., 1854, p. 222, pl. 34, fig. 3.

of O. Mac Leayii, there is a typical specimen in the cabinet of the British Museum," described that insect and gave a figure of its venation, which is not that of *Platoeceticus;* but the next year (1855) Walker [12] recorded only two specimens of *"Psyche" macleayi* in the British Museum, ascribing both to Australia. Did Westwood describe the true *macleayi* or an Australian insect perhaps superficially resembling it? Then in 1881, Heylaerts [13] repeated Westwood's version of the venation of *macleayi* and on later pages [14] created for it the genus *Lansdownia,* crediting it to "Amerique merid"; but in 1884 he recognized *Lansdownia* [15] to be a synonym of *Eumeta* Wlk. In 1892, Kirby [16] added to the confusion by listing *macleayi* under *Eumeta* Wlk. and again reversing its stated habitat to Australia. The same year Hampson [17] listed *Eumeta, Cryptothelea* and *Lansdownia* all as synonyms of *Clania* Wlk. In 1907 Meyrick and Lower [18] in their "Revision of the Australian Psychidae" referred *macleayi* Guild. to the genus *Eurycyttara* Hamps., stated that the unique type is in the British Museum, and repeated Westwood's description of its venation. In 1929 Dalla Torre and Strand [19] listed *"Mac Leayi"* Guilding under *Cryptothelea* Duncan, and ascribed it to Australia. Finally, Gaede [20] in 1936, ignoring the fact that *Cryptothelea* Duncan has time-precedence, listed *macleayi* Guild. under *Platoeceticus* Pack., and once more assigned this insect to the western hemisphere.

Thus *macleayi* Guild., shuttled back and forth as a West Indian and an Australian insect, and successively assigned to *Oiketicus, Cryptothelea, Lansdownia, Eumeta, Clania, Eurycyttara,* and lastly to *Platoeccticus* Packard, constitutes a present threat to the status of *Platoeceticus* as a valid genus. For the unraveling of this almost incredible confusion, reference to the British Museum specimens seemed to offer little promise; but in 1924, with the coopera-

[12] Cat. Lep. Het. Brit. Mus., IV, p. 955.
[13] Ann. Soc. Ent. Belg., XXV, p. 45, fig. 1.
[14] Ann. Soc. Ent. Belg., XXV, pp. 65 and 66.
[15] C. R. Soc. Ent. Belg., 1884, p. xxxvii.
[16] Syn. Cat. Lep. Het., p. 504.
[17] Fauna Brit. India, Moths, I, p. 291.
[18] Trans. and Proc. Roy. Soc. So. Austr., XXXI, p. 207.
[19] Lepid. Catal., XXXIV, p. 189.
[20] Strand, Seitz Macro-Lepid., VI, p. 1183.

tion of Mr. W. H. T. Tams, search there resulted in finding under the name of *macleayi* just two old specimens—one of these labeled Australia and presumably one of the two listed by Walker [21] in 1855. The other carried pin-label numerals only, with no designation of collector, locality, or name; and it differed essentially in venation from Westwood's [22] 1854 description of typical *macleayi* as then represented in the British Museum. Examined without dissection, it proved to be an 11–7 veined insect (typical *Platoeceticus* being 12–8), the median within the cell not forked; antennal and leg structures seemed in agreement with *Platoeceticus*. But even if this specimen could be conclusively traced to the Guilding collection, that fact alone would not unmistakably establish it as typical *macleayi,* for in his text [23] he stated, "Tertia species ni fallor mox describenda."

Though Guilding's work was remarkably thorough and good for its period (1826), the most critical examination of his text and figures [24] proves inadequate for the determination of whether *Platoeceticus* Pack. with *gloverii* as its type is generically distinct, or is congeneric with *Cryptothelea* Duncan with *macleayi* as its type, and hence a synonym. By some of Guilding's indicated characters, that probability is strengthened; by others, seems definitely contradicted. The prominent cephalic cocoon-opener shown in his figure [25] of the male pupa; his statement [26] of the female pupa, "ano simplici" and his figures showing that pupa without indication of the curved anal hooks which though inconspicuous are characteristic of *Platoeceticus;* his statement,[27] "Larva cauda semper erecta" and his illustration of a high-conical regularly tapering sack are all in greater or less disagreement with the known species of *Platoeceticus*. Perhaps not the least significant is the peculiar ornamentation of that sack with its few wide-angled projecting fragments—an unusual condition exactly duplicated by

[21] Cat. Lep. Het. Brit. Mus., IV, p. 955.
[22] Proc. Zool. Soc. Lond., XXII, p. 222, pl. 34, fig. 3.
[23] Trans. Linn. Soc. Lond., XV, p. 375, 1827.
[24] Trans. Linn. Soc. Lond., XV, pp. 375–377, pl. 8, figs. 1–14, 1827.
[25] Trans. Linn. Soc. Lond., XV, pl. 8, fig. 4, 1827.
[26] Trans. Linn. Soc. Lond., XV, p. 375, pl. 8, figs. 6, 7, 1827.
[27] Trans. Linn. Soc. Lond., XV, p. 375, pl. 8, fig. 12, 1827.

an unidentified species shown [28] by three of the figures of the lower row on plate VI (figs. 28, 29, 30).

Considering all these circumstances, it would seem the wiser course to restrict *Cryptothelea* Duncan to the one species, *macleayi* Guild., until a more nearly complete knowledge of the Psychids of the West Indies and of the American Tropics permits its satisfactory recognition, and to retain *Platoeceticus* Packard as a valid genus with *gloverii* as its type species.

Much of the confusion relating to these and other representatives of the *Psychidae* has obviously resulted from an inadequate recognition of the generic and specific characters of the insects involved, and it now seems desirable to restate and expand the characterization of the genus *Platoeceticus,* grouping around its type those species (including all those recognized in the United States fauna) of which adequate material is available for study and which though specifically distinct, surely fall within the generic concept. Including some characters frequently omitted or ignored in past descriptive work, the genus may be defined thus:

PLATOECETICUS Packard

Adult male: Of rather slender habitus and moderate size (usually not exceeding 20 mm. in expanse of wings). Antennae bipectinate, the pectinations gradually decreasing in length to obsolescence at the distal end of the shaft. Eyes globose, large, narrowing the vertex. Legs slender; the fore tibia without a spine (epiphysis); mid and hind tibiae each with one well-developed apical spur. Wings broad, unicolorous. The fore wings not markedly acute; the hind wings shorter, rounded. Normally with 12–8

[28] Collected at Claremont, Jamaica, by Mr. E. L. Bell in 1931. The possibility and even the probability that *macleayi* may not have been native of or restricted to the island of St. Vincent, should not be overlooked. There is a conceivable relation between the persistence of its assignment to Australia, and the fact that MacLeay, to whom Guilding dedicated it, left England for Cuba in 1826 and later made his home in Australia. Further and perhaps more significantly, St. Vincent was the site of one of the earliest botanic gardens in the Western Hemisphere, where plants were assembled at great expense from the available tropical world, for propagation and distribution to the English colonies. Guilding was the author of a now rare volume, published at Glasgow in 1825, entitled "An account of the botanic garden in the island of St. Vincent, from its first establishment to the present time." The obvious opportunity for the unintentional introduction of such easily transportable insects, and Guilding's undoubted acquaintance with the products of other areas, may account for his vagueness in assigning a more definite habitat to *Oiketicus,* and also for the present difficulty of determining the true habitat and identity of his two species, *kirbyi* and *macleayi.*

veins, though individually variable, with M_1 of the hind wings tending to partial or complete obsolescence in some species. On the fore wings, A_2 and A_3 are connected near the base, and from their junction A_3 is continued as a spur which approaches the inner margin; beyond the middle of the wing A_1 curves downward to join A_2, their continuation becoming coincident to the margin. On both fore and hind wings, M within the cell is unbranched; M_2 and M_3 are normally separate at the margin but usually converge proximally and are stemmed to the cell or (less frequently) arise from or near a common point at the cell. On the hind wings, Sc and Rs are separate throughout their course and are not connected with a bar; by individual variation, M_1 may arise either below, at, or above the termination of M at the cross vein. In dried specimens the abdomen about equals or slightly exceeds the hind wings. The genitalia are slender, elongate; the aedoeagus is without bulblike expansion of the base; the apex of the sacculus is minutely toothed.

In addition to those individual variations which in this family are so often confusing, other and constant divergences separate the few species which are known to conform to these generic characters. Those of which adequate material is available are given separate treatment in the following pages, beginning with the type species.

Platoeceticus gloverii Packard

(Pl. III, fig. 1; pl. IV, fig. 5; pl. V, fig. 9; pl. VI, figs. 14–18.)

In this species the antennae (Figs. 1 and 5) present the most readily recognizable specific character. These have approximately (not more than) twenty-five joints; the longer pectinations are based proximad to the middle of the joints from which they arise; these pectinations are coarse, blunt, slightly swollen at their distal extremities, and their irregularly placed hairs are comparatively coarse, strongly inclined rather than erect, and in length about equal to the diameter of the pectination from which they spring. This gives a characteristic "stubby" appearance to the antenna of this species, recognizable at low magnification. The wing-scales are narrow, single-pointed, almost hair-like. In this species the normal venation of the fore wing is for R_5 to be shortly stemmed to the stem of R_3 and R_4, though by individual variation sometimes evident on one wing, absent from the other, R_5 may be connate with that stem at the cell, or more rarely may arise slightly below that position; normally, M_2 and M_3 are short-

stemmed to the cell. On the hind wing M_1 arises variously, as indicated in the generic description; M_2 and M_3 are usually stemmed but occasionally connate at the cell. The genitalia and furcate plate (Fig. 9) show constant differences between this and our other species of the genus, which will be obvious by reference to the accompanying illustrations (Plate V). In 1924 the satisfactory recognition of *gloverii* was complicated by Barnes and Benjamin, who in the belief that certain Psychid moths reared by Mr. Benjamin from orange-feeding larvae collected in Mississippi were the true *gloverii,* in distinction from what they interpreted to be a more common general-feeding insect with which it had been confused, presented that viewpoint with this pronouncement [29]: "Until evidence tending to disprove is submitted, it is proposed to restrict the name *gloverii* to the blackish, Gulf-strip, orange-feeding species; whose bags agree with the Glover figures." Taking up in turn their several reasons for that belief:

(a), ". . . until 1922 no one else had reported rearing a small Psychid from orange." That statement was based upon a palpable oversight, for *gloverii* had been recorded at length in the published original observations of Comstock,[30] of Ashmead [31] and of Hubbard,[32] who all recognized *gloverii* as a general-feeding species sometimes economically significant as a pest on orange.

(b), "These cases agree well with those of the Glover manuscript figure, being covered with rather small fragments and appearing nearly naked. . . . The cases of the commoner southern Psychid . . . do not resemble the cases figured by Glover, except in size." Glover's own words [33] regarding these cases are "interwoven with dried scraps of the leaf itself, or any other material over which the worm may wander." As Barnes & McDunnough point out [34] with reference to another species, it is true that "the larval cases are recognized as one of the best means of specific identification," for most species follow a somewhat rigid pattern in the foundation structure of their sacks; yet the sacks of many general-feeding species (familiarly, *ephemeraeformis, abbotii*)

[29] Contr. Nat. Hist. Lep. No. Amer., v, (3), p. 189, 1924.
[30] Rpt. U. S. Ent., pp. 251–252, 1880.
[31] Orange Insects, p. 51, 1880.
[32] Spec. Rpt., U. S. Dept. Agr., Ins. Affect. Orange, pp. 69, 148, 149, 1885.
[33] Rpt. U. S. Comm. Patents for 1858, Agric., p. 264, (1859).
[34] Can. Entom., XLVI, p. 29, 1914.

often differ enormously in their external appearance, due to the nature and the variable quantity of material attached by the larvae. *Gloverii,* especially when it feeds upon fruit-rinds, smooth bark, or thick leathery leaves (all commonly acceptable), sometimes attaches little extraneous matter to its silken case (Fig. 14); when upon occasion it departs from a vegetable diet and becomes an important predator on scale insects, it adorns and whitens its bag (Fig. 16) with the dry fragments of its prey.[35] Contrary to Mr. Benjamin's experience with an orange-feeding larva which he identified as the true *gloverii,* one of the same lot sent by him to the writer promptly accepted a change of food-plant, from orange to arbor-vitae, and ornamented its case extensively (Fig. 15) with fragments from this adopted food. In a single infestation, sacks comparatively bare and sacks well covered with vegetable fragments sometimes occur side by side (Fig. 18); and this is true also of the related species, *nigrita* (Pl. VI, figs. 19–24), and no specific differences are involved in these conditions.

(c), One more distinction was claimed by Barnes and Benjamin for their "restricted" *gloverii:* that it is "blackish" rather than brown. It is true that Glover's antecedent reference to the "Hang worm" of the orange called it a black insect; but Packard's original description based entirely on Glover's drawing says "It is dark brown throughout." Hubbard[36] in 1885; Hunt[37] in 1923; Quayle[38] in 1938, all describe the moth as dark brown, and two of these authors include illustrations from original photographs of orange-feeding insects showing sacks well covered with projecting vegetable material. It is true that adults of *gloverii,* in common with other unicolorous sooty-winged Psychids, exhibit some degree of variation in density of color. Freshly-emerged insects tend to be notably blacker than flown examples, and cabinet specimens in time attain a large degree of uniformity. Beyond these fugitive differences, such gradations are here interpreted as individual differences in degree of pigmentation without specific or (traceable) foodplant causation. In the exchange and comparison

[35] Plank and Cressman, Mo. Bull. Dept. Agr. Calif., no. 23, pp. 207–209, 1934.
[36] Spec. Rpt., U. S. Dept. Agric., Ins. Affect. Orange, pp. 69, 148–149.
[37] Quar. Bull. State Plant Bd. Fla., II, pp. 159–165.
[38] Insects of Citrus and other Subtropical Fruits, pp. 333–335.

of specimens, slides and camera-lucida drawings between Mr. Benjamin and the author, antecedent to his proposed restriction, no single structural character was found upon which to base that separation; and it was then, and now with much more material available, it is still the writer's considered opinion, that a single species is here involved.

The status of at least one other name is bound up with this conception of *gloverii*. In 1922 Barnes and Benjamin discovered that the series of Psychids then standing in the Barnes collection under the name of *Manatha nigrita* really included representatives of at least one other species. From these they selected twenty specimens from San Benito, Texas, as types of a species which they described [39] as *Manatha jonesi,* characterizing it as "Entirely similar to *M. nigrita* B. & McD. in superficial appearance, perhaps averaging very slightly smaller. Antennae of the male less heavily pectinated than in *nigrita,* the pectinations being fewer, and little more than half as long." They rightly considered an apparent difference in venation to be without significance, nor was the stated difference in number of antennal pectinations borne out by later slide-mount study. At the time of description the much closer relationship or actual identity of *jonesi* with *gloverii* was overlooked, through dependence upon Packard's statement that *gloverii* is a 12–7 veined insect. Too late for modification of the description of *jonesi,* then in process of publication, that relationship was recognized, and Mr. Benjamin wrote (letter of June 29, 1922) "I strongly believe that it is very likely that the Texas form I described will prove at least a valid race if not a valid species from the larger Florida form with similar antennae," the "larger Florida form" of course being *gloverii* as herein defined. Comparative studies utilizing cotype material of *jonesi,* and extensive field-acquaintance with the insect, have failed to reveal to the writer any essential specific difference between *gloverii* and *jonesi,* and he believes that if the latter name is to be retained, it should not be accorded more than (intergrading) racial status, thus applying it to *gloverii* as it occurs under semi-desert conditions, with wing-expanse and larval sacks averaging slightly smaller than commonly exhibited by the species in the more humid portions of its range.

[39] Contr. Nat. Hist. Lep. No. Amer., I, pp. 46–47.

The abundant literature of *gloverii* has recorded for this species a wide distribution on the Coastal Plain of the southern United States, and it does not seem necessary to list in full detail each of the specimens utilized in this study. These have included 29 adult males (20 slides) reared or captured by the author, as follows:

South Carolina: Charleston, 5, May–Aug.
Florida: Jacksonville, Ft. Myers, Royal Palm State Park, Key West, 10, Jan.–Apr., July.
Mississippi: Biloxi, 1.
Louisiana: New Orleans, 6, Apr., May.
Texas: San Antonio, Brownsville, 7, Apr.–June.

In addition to these, a few scattered specimens from various sources do not add materially to distributional or seasonal data, except to confirm at least occasional autumnal emergences. More significance attaches to these specimens, retained from series supplied by Mr. Benjamin in the course of past correspondence relative to his conception of *gloverii* and of the status of *jonesi* B. & B.:

Mississippi: 3 (5 slides), Apr., May, July.
Texas: San Benito, paratypes of *jonesi*, 6 (11 slides), July, Aug.

Though limited in northward extension, *gloverii* as a species is obviously tolerant of somewhat diverse climatic conditions and everywhere exhibits wide adaptability in choice of larval food, so that its presence to the southward beyond our national boundaries was to be anticipated. Indicative of such extension, the following material has been available for study:

Mexico (supplied by Dr. Alfonso Dampf): Tamaulipas—Matamoros, 2, July. Tabasco—Frontera, Villa Hermosa, 6, June, Aug. Oaxaca—Loma Bonita, Paso Bodegas, 2, Feb., June. Guerrero—Zacualpan, 2, (from R. Müller coll.).
Guatemala: Tiquizate, 2, Apr., (C. P. Heinrich) and Cayuga, 1, Feb., (labeled "*Chalia pizota* Sch., Schaus & Barnes coll.").

The Mexican specimens are trap-lantern material and in poor condition; but both these and the Guatemalan specimens have sufficed to determine that in venation they conform to *gloverii* (12–8 veins), and for each locality at least one slide of genitalia and

abdominal plates evidences similar conformity. Lacking detailed study of the U.S.N.M. type, this is not intended as a positive reference of *pizote* Schs.[40] to the synonymy of *gloverii,* though three additional specimens seen in the British Museum, labeled *"Chalia pizoti* Schs., Guatemala, Cayuga," are also in agreement.

South of our national boundary the indicated distribution of *Platoeccticus* includes such diversities in altitude, of climatic conditions, of floral environment varying from semi-desert to tropical rain forest, that racial if not specific modifications would seem inevitable; and from several widely scattered localities, deviations from normal *gloverii* have been recorded. Forty available specimens of *gloverii,* South Carolina to Texas inclusive, show an average wing-expanse [41] of 17.5 mm., a maximum of 20 mm., and only one of less than 16 mm; vein M_1 is present on the hind wings of all forty, which thus are consistently 12–8 veined. Twelve slide-mounts of antennae, United States specimens, show from 22 to 25 joints (scape, pedicel, and clavola), though other specimens from south of our border but herein assigned to *gloverii* show as few as 20 such segments. In contrast with these, in her "Monografico de las Psychidae de Mexico," [42] Miss Leonila Vazquez, by her text and figures indicates that some of her material from the State of Vera Cruz and assigned to *gloverii,* in expanse of wings (as little as 12 mm.), in number of antennal joints (18), and in venation (lacking M_1 of hind wings and exhibiting other divergences from normal *gloverii*) presents wide departure from *gloverii* as it occurs in the United States and in some other Mexican localities. In 1914 Dr. Dyar gave specific rank to a *Platoeceticus* smaller than *gloverii,* by describing

Platoeceticus symmicta Dyar [43]

Dyar's unique type of *symmicta* was collected at Ancon, Canal Zone, and his exceedingly brief description offers no basis for its separation from *gloverii* except its stated size, "Expanse 12 mm." The larval case accompanying the type is like that of *gloverii,* except in size. The author is indebted to Mr. Heinrich for a sketch of the venation of *symmicta,* and for opportunity to see a slide of

[40] Schaus, Proc. Ent. Soc. Wash., XXIX, p. 185, 1927.
[41] Double the distance from apex of fore wing to meson of thorax.
[42] Anales Inst. Biol., XII, pp. 304–307, 310; figs. 14–20, A–F, 1941.
[43] 1914, Proc. U. S. Nat. Mus., XLVII, p. 254.

its genitalia. These show it to be a 12–7 veined insect (M_1 of hind wing absent), with genitalia and furcate plate in general agreement with *gloverii.*

Further evidence of the presence of insects of this genus, smaller than typical *gloverii,* has accumulated in scattered records of Psychids intercepted by inspectors at our ports of entry, usually in shipments of bananas. Specimens which the author has been permitted to examine have usually been in almost fragmentary contition; but in approximate size, in venation of the hind wings (lacking M_1), in genitalia and furcate plates, they seemed in specific agreement with *symmicta* Dyar. Guatemala, Honduras and Nicaragua have been represented in this manner, and these records, in connection with those from southern Mexico (Vazquez) and the Canal Zone (*symmicta* Dyar), indicate a wide distribution throughout Central America of such species or races (perhaps only one) whose exact status with reference to *gloverii* must await fuller knowledge of possible intergrades in these various populations. In extent of individual structural modification in response to "shock"—unusual conditions of temperature, humidity, change of food, confinement—the Psychids seem almost unique, and no conclusions are safe, unless based upon the study of abundant material. Fortunately, other representatives of *Platoeceticus* involve no similar uncertainties. Among these is

Platoeceticus nigrita (Barnes & McDunnough) [44]
(Pl. III, fig. 2; pl. IV, fig. 6; pl. V, fig. 10; pl. VI, figs. 19–24.)

This species was collected and reared by the writer at Biloxi, Mississippi, in the spring of 1910, and was then identified by Dr. Dyar as the "ground-feeding form of *gloverii.*" Credit for the detection of a positive character for its separation must be given to Barnes & McDunnough, who in 1913 described it [44] as *Manatha nigrita.* The genus *Manatha* Moore, with *albipes* Moore (Ceylon) as its type species, was treated by Hampson as a subgenus of *Psyche* Schrank, long a dumping-place for many and diverse *Psychid* species but finally restricted by Kirby who in 1892 designated *viciella* Denis & Schiffermüller (European) as the type of *Psyche.* Both *albipes* and *viciella* are 12–8 veined insects having

[44] Contr. Nat. Hist. Lep. No. Amer., II, (4), p. 170, 1913.

Sc and Rs of hind wings joined with a bar, and both species present other differences of structure and general habitus, in comparison with *Platoeceticus,* with which latter genus *nigrita* is in full accord.

Even to the naked eye the broader pectinations of the antennae (Figs. 2 and 6) of *nigrita* serve to distinguish it, for they are nearly half as long again as in *gloverii,* more slender, and their sensory hairs are finer and longer than in that species, divesting the antennae of the "stubby" appearance so characteristic of *gloverii.* The number of antennal segments is usually twenty-five, and the wider pectinations arise about midway of the shaft-segments which bear them, instead of proximad to that point.

The wings of *nigrita* appear somewhat more thinly scaled and lighter in tone than average *gloverii,* and in venation the two species are in close agreement, though of seven wing-mounts of *nigrita* one hind wing shows traces of a character (entirely absent from the opposite wing) which may have ancestral significance, in that a faint pseudoneuron may be traced, joining Sc and Rs, in position proximad to that occupied by such a bar in *confederata* Grt. and related species.

The genitalia (Fig. 10) are more slender and elongate in *nigrita,* and the rods of the furcate plate of the eighth abdominal segment are markedly more slender and elongate, than in *gloverii* (Fig. 9) though like that species they are rounded and spoon-like at their distal terminations.

Nigrita is an inhabitant of low herbage, or a ground-feeding species. For pupation, its larvae creep up tree-trunks, posts, rocks, or available foliage to varying heights, though usually attaching its sacks at not more than three or four feet from the ground. The slender needle of a young pine is frequently selected as the site from which to dangle. The sacks (Figs. 19–24) are usually covered with a shaggily-projecting thatch of fine grass-fragments, though like *gloverii* the amount of attached material is variable, and occasionally a sack in almost bare condition may be found, its pale brown silk usually serving to distinguish it from bare sacks of *gloverii,* which are greyer.

Though the available specimens are all from spring emergences (the earlier dates, January to March from southern Florida), field-

observations have indicated summer or autumnal maturity for some individuals. Thirty-three adult males (24 slides) and much supplementary material are in the author's collection, all but one of his rearing or capture, as follows:

FLORIDA: (labeled "Everglade, Cotype Brns., Apr. 8–15"), 1. Lakeland, St. Petersburg, Punta Gorda, Ft. Myers, Miami, Royal Palm State Park, Homestead, 21, Jan. 27–May 15.
ALABAMA: Delchamps, sacks.
MISSISSIPPI: Biloxi, 11, May 1–20.

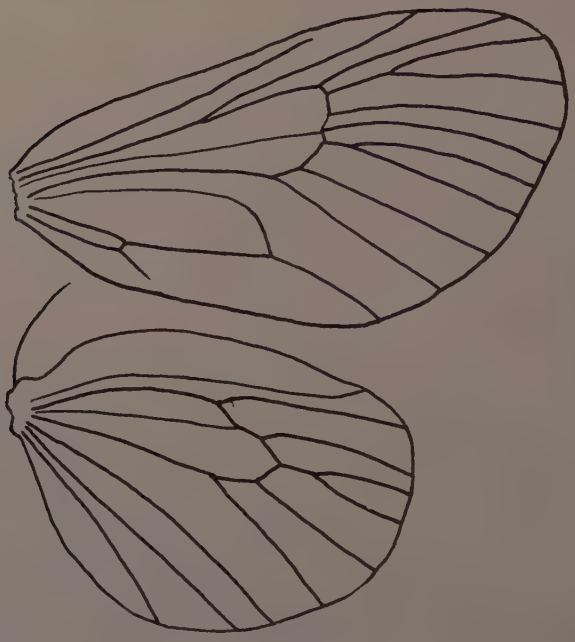
An undescribed species, in some of its characters intermediate between *gloverii* and *nigrita* but amply distinct from each, is here designated

Platoeceticus congregatus new species
(Pl. III, fig. 3; pl. IV, fig. 7; pl. V, fig. 11; pl. VI, fig. 13.)

Adult ♂. Expanse 16–18 mm. The eyes are less prominent and the vertex proportionately narrower than in *gloverii* or *nigrita*. The antennae (Figs 3 and 7) are dark in color and have twenty-five segments; their pectinations are short like those of *gloverii,* though more slender, and their longer pectinations originate about midway of the shaft-segments bearing them; their sensory hairs are longer, finer and more erect than those of *gloverii.* This is a sooty black species, though the wings are less opaque than those of *confederata* Grt., and the wing-scales are narrow and single-pointed as in *gloverii.* In general, the venation (Text-fig. 1) is essentially as in *gloverii* and *nigrita,* except that in the fore wing R_5, which in those two species more frequently arises from the stem of R_3 and R_4 or from a point with that stem, in the present species originates far below that point, and hence at the cell is nearer M_1 than to R_4. *Congregatus,* in its genitalia (Fig. 11), its furcate plate, and in the sensory hairs of its antennae more closely resembles *nigrita;* in its shortly pectinated antennae, *gloverii;* and in its venation, diverges from both.

The sack of *congregatus* (Fig. 13) is about 16 mm. in length, and from its narrowed ends is gradually dilated to a diameter of 5 mm. at two-fifths of its length from the point of attachment. It is rather closely thatched with fine grass fragments applied longi-

tudinally, though these do not completely conceal the pale silken foundation, nor do they project widely or shaggily, as in *nigrita*.



Text-figure 1.—Venation of *Platoeceticus congregatus* new species.

The name *congregatus* relates to a habit of the larvae in affixing their sacks for pupation. In late December, 1943, Dr. Alfonso Dampf found the sacks in dense clusters, "over 50 clued together," in crevices or partly concealed by scales of bark, on the trunks of (then) leafless Burseraceous trees which occurred in scattered growth under semi-desert conditions between Puente de Ixtla and Taxco in the State of Morelos, Mexico, at an altitude of about 1000 meters. On December 28 some of these sacks contained living larvae, which continued in a lethargic state until at least March of the succeeding year; and from these sacks, without observed resumption of larval activity, adults emerged in August and early September, 1944. In other desert species, long periods of lethargy followed by resumption of activity and the eventual

completion of transformations, are responses to rainfall conditions rather than to elapsed time or to changes of temperature, and *congregatus* in its life-cycle seems to follow such a program. With it, larval assemblage for pupation is possibly not a fixed specific habit, and in this observed instance may have been brought about by a density of ground-herbage population and a scarcity of suitable permanent supports, for Dr. Dampf writes "During this time (September to June) grass and all the lower vegetation becomes completely scorched and under the influence of wind is converted into dust."

Described and illustrated from twelve specimens (some of them in badly broken condition through damage in transit). One pinned specimen in fair condition is designated as the type, and with some paratype material is returned to Dr. Dampf in Mexico City. Two pinned specimens (paratypes) and twelve microslide preparations (parts of paratypes) and the sack-clusters photographed for illustration, are retained in the collection of the author.

In this difficult family, its components presenting some characters which are specifically indeterminate through wide individual variability, others whose significance is obscure through interspecific similarity, it sometimes becomes a question how much weight to attach to differences which are not exclusive under an adopted generic characterization, but which are nevertheless definite divergences from the generic type and its closer associates. Of this nature is the reference to *Platoeceticus,* of

Platoeceticus watsoni Jones [45]

(Pl. III, fig. 4; pl. IV, fig. 8; pl. V, fig. 12; pl. VI, figs. 25–27.)

Known from reared material collected by F. E. Watson in 1922 on the island of Haiti, its original description [45] and accompanying illustrations make unnecessary any detailed comparison of the sacks, larvae, pupa, adult and its structural characters, with those of *gloverii.* By that text and by further study of cotype material it appears that *watsoni* differs from the other species here included under *Platoeceticus,* in the number of antennal joints, 30 instead of 25 or less (Figs. 4 and 8); conspicuously in the size and shape of its wing-scales, which are flat, broad and distally obtuse, in-

[45] Entom. News, XXXIV, pp. 101–103, pl. IV, figs. 13–15, 17, 19, 1923.

stead of narrow and pointed; recognizably in its genitalia (Fig. 12), and markedly in the structure of its furcate plate. Its sacks (Figs. 25–27) conform to the generic pattern, and lack the wide-angled projecting fragments apparently characteristic of Guilding's *macleayi* and also exhibited by those of the Jamaican species shown in comparison. In the unanticipated event that *watsoni* eventually should prove identical with *macleayi* and hence the type of *Cryptothelea,* the question will arise whether its divergence from the other species here considered under *Platoeceticus* is sufficient to justify the retention of that generic name for those species.

It is fully realized that in thus far basing a discussion of a genus and its included species almost exclusively upon the characters of the adult males and of their sacks (artificial fabrications by their larvae), a wide gap in that attempted exposition is left untouched. The Psychids, however, present a unique problem, for in an enumeration of the family, generic and specific characters of the adult males, not one of these characters may be found in recognizably similar form in the females. Even those few species (of the United States) whose females possess functional eyes, antennae, legs (but no wings) exhibit these organs in quite different form from those of the associated males; and as is well known, the females of the "higher" Psychids (to which *Platoeceticus* belongs) are maggot-like, destitute of all developed appendages, and frequently have been referred to as mere bags of eggs. Their integument is so frail and transparent that the eggs in their convoluted ovaries obviously make up the greater part of the insect; in some species a faint and blurred version of the color-pattern of the larva persists; the eyes may be represented by pigmented dark spots; the firmer-textured thoracic segments exhibit some degree of permanent and characteristic form, but the sparse flocculent clothing of a portion of the obese and soft abdomen is so loosely attached that most of it is lost before a specimen can be procured in satisfactory condition for preservation. To secure such specimens, they must be collected after the pupa-shell has split for mating and emergence, and before the eggs have been deposited in that shell—usually a matter of a few hours or of a very few days

at most. Williams [46] and others have shown that the internal structures of female Psychids of several genera exhibit significant differences; but only a few species have been thus studied, the technique of examination is not easy, and the procurement of material in suitable condition presents a constant obstacle.

Under these circumstances it is fortunate that another approach to some consideration and comparison of our female Psychids is often possible. The pupa-shells of these females are comparatively rigid in texture; they remain in their enclosing sacks long after the disappearance and death of the insects; they may be collected in the field in satisfactory condition for study over periods of many months, or recovered from cabinet specimens of the sacks after the expiration of years; and they present characters of comparatively easy examination, tying them in with similar male structures to a degree far beyond that offered by the adults. Even if by breakage the heads and thoracic portions of these pupae should be obliterated, these significant abdominal characters are usually intact: the comparative length and width of the several segments, thus determining the general form of the pupa; the presence or absence of anal hooks; caudally-directed toothed ridges on the dorso-cephalic margins of at least some of the segments; rows of cephalicly-directed setae near the dorso-caudal margins of these or other segments; the form and location of the genital opening, and the sculpturing of the fixed abdominal segments, 7, 8, 9 and 10.

In the male pupa of our higher Psychids, two ventrally-directed anal hooks are always present. These obviously function by enabling the partially-extruded male pupa to suspend itself securely from the lower opening of its sack, throughout the struggles incident to the emergence of the adult; the toothed ridges and rows of setae, by successive entanglement and release of their holds on its silken lining, facilitate pupal movements up and down within the sack.

The female pupa has one fewer free abdominal segment than has the male, and its movements within its sack are less extensive, though in at least some species it pushes downward until the developed adult, partly emerging from its pupa-shell, may temporarily protrude slightly from the sack—a posture which has

[46] Jour. Morph., LXXV, pp. 251–260, 1944, and elsewhere.

been interpreted as "calling" the male by the air-distribution of scent-scales. These habits of the female pupa do not involve need for specialized anal hooks, and an examination of representatives of all our native genera and most of their included species shows that though silk-entangling rugosities are present on the anal areas of some female pupae, symmetrically-formed pointed hooks have persisted in these three genera only: *Platoeceticus* Packard; *Prochalia* Barnes & McDunnough; *Zamopsyche* Dyar. Some exotic genera, however, also exhibit this character.

The toothed ridges and the rows of setae,[47] in their distribution on the abdominal segments, show a general but not invariable correspondence between those of the male and female pupae. Unless a series of specimens is available, the variable extent to which these segments telescopically overlap sometimes renders the detection of these characters difficult; and differences in the degree of their development, specific or individual, may render decision on their presence or absence a matter of interpretation. In the accompanying table the segment-numbers enclosed by parentheses indicate those on which these characters are usually faint or even sometimes definitely absent.

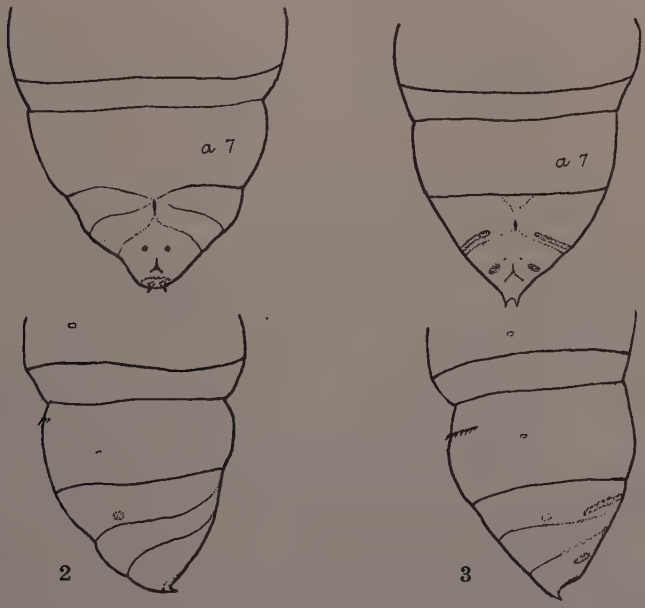
Pupae whose females bear anal hooks[48]

	Abdominal segments bearing a caudally-directed toothed ridge		Abdominal segments bearing a row of cephalicly-directed setae	
	Males	Females	Males	Females
Platoeceticus				
gloverii Pack.	(5), 6, 7, 8	5, 6, 7, (8)	3, 4, 5	(3), 4, 5
nigrita (B. & McD.)	6, 7, 8	3, 6, 7	3, 4, 5	4, 5
watsoni Jones	4, 5, 6, 7, 8	4, 5, 6, 7	(2), 3, 4, 5	4, 5
congregatus Jones	3, 4, 5, 6, 7, 8	3, 6, 7, 8	3, 4, 5	4, 5, 6
Prochalia				
pygmaea B. & McD.	3, 4, 5, 6, 7, 8	3, 4, 5, 6, 7, 8	3, 4, 5, 6	3, 4, 5, 6
Zamopsyche				
commentella Dyar	(4), (5), 6, 7, 8	4, 5, 6, 7, (8)	3, 4, 5, 6	3, 4, 5, 6

[47] For some other Psychid genera (*Oiketicus, Thyridopteryx*), these are described and illustrated by Mosher, *Bull. Ill. St. Lab. Nat. Hist.*, XII, pp. 39, 40; figs. 11–14, 1916.

[48] It should be noted that pupae of both sexes of *gloverii, nigrita, pygmaea, commentella,* and male pupae of *congregatus* were available in adequate numbers (at least six of each, usually many more); *watsoni,* and female *congregatus* were less satisfactorily represented, and no authenticated specimens of the pupae of *symmicta* Dyar were seen.

In his extended treatment of the *Psychidae* of Argentina, Köhler [49] has made significant use of other characters of the fixed abdominal segments of the female pupae. Some of these, applied to *Platoeceticus* as here defined, offer further means of specific identification. Our species of the genus present these characters in common: two small sharp anal hooks, more or less curved and directed ventrad; the genital opening vertical, slit-like, without marked marginal sculpture; the anal furrow an inverted Y; segmental boundaries of the fused segments (7–8, 8–9, 9–10) plainly marked dorsally, fading out on the polished ventral surface. Specifically, our four species available for examination present these apparently constant differences:



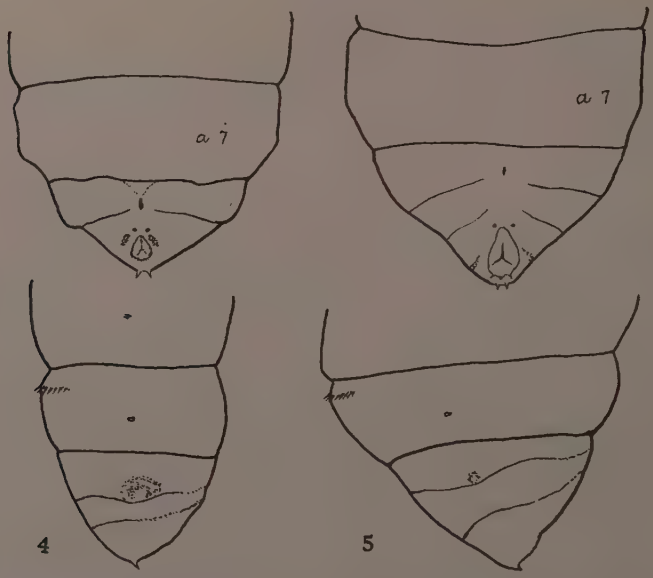
Anal Segments of Female Pupae; lateral and ventral aspects.

Text-figure 2.—*Platoeceticus gloverii* Packard.
Text-figure 3.—*Platoeceticus nigrita* (Barnes and McDunnough).

[49] Physis, XVII, pp. 457–471, pls. 1–4, 21 figs., 1939.

Gloverii. Ventral surface smoothly polished; the Y-shaped anal furrow deeply incised, its margins swollen, cushion-like; two distinct punctuate markings, one either side of the meson, slightly cephalad from the stem of the Y (Text-fig. 2).

Nigrita. The punctuate markings minute; the Y shallower than in *gloverii,* its margins lower; an elongate low verruga, lateral and oblique, opposite the genital opening; another, opposite the anal Y (Text-fig. 3).



Anal Segments of Female Pupae.

Text-figure 4.—*Platoeceticus congregatus* new species.
Text-figure 5.—*Platoeceticus watsoni* Jones.

Congregatus. The double punctuation present, but small and inconspicuous; caudal margin of segment 7 shallowly crenulate; the anal Y and its accompanying verrugas less plainly marked than in *nigrita* (Text-fig. 4).

Watsoni. Anal hooks relatively small; two punctuate marks above the stem of the Y; the anal furrow on a raised area, outwardly sharply defined (Text-fig. 5).

Especially if considered in connection with the sacks from which they have been abstracted, these pupal characters, with those tabulated on page 118, will usually be adequate for the specific identification of the included species.

There remains for consideration a series of names of insects, which either by original designation or later reference have been placed under the genus *Platoeceticus* Pack. Lack of acquaintance with the generic characters as presented by its type species, dependence upon a single character (usually wing-venation), or sometimes pure guesswork, seem to have contributed toward the placement of some of these names, possibly none of which will be accorded permanent place in this genus as here characterized. In the order of their description, these are:

1884.	*cassiae* (Weyenbergh), Tijdschr. v. Entom., XXVII, p. 9.	Argentina
1906.	*marona* Schaus, Proc. U. S. Nat. Mus., XXIX, p. 345.	Fr. Guiana
1911.	*costaricensis* Schaus, Ann. Mag. Nat. Hist., (8), VII, p. 634.	Costa Rica
1914.	*aphaidropa* Dyar, Proc. U. S. Nat. Mus., XLVII, p. 253.	Canal Zone
1924.	*rebeli* (Köhler), Fauna Argentina (coll. Breyer), II, p. 25; pl. 3, fig. 24; pl. 8, figs. 20a–c.	Argentina
1931.	*rugosa* Köhler, Rev. Soc. Ent. Argent., III, pp. 349–351.	Argentina
1931.	*tandilensis* Köhler, Rev. Soc. Ent. Argent., III, pp. 349–351.	Argentina
1939.	*hoffmanii* Köhler, Arb. u. Taxon. Ent. Berlin-Dahlem, VI, p. 38.	Cuba
1939.	*chaquensis* Köhler, Physis, XVII, pp. 460, 461; pls. I and IV, figs. 5 and 11.	Argentina

Considering these in their stated order:

Cassiae (Weyenb.). Years ago, Weyenbergh's types were reported to have been destroyed. His text and illustrations of several species have been considered unrecognizable and have been purposely omitted by Strand. In 1887 Heylaerts [50] redescribed the male of *cassiae* from material sent him by Berg; he transferred the insect from *Psyche* to *Platoeceticus,* but stated that veins 7 and 8 of its hind wings are joined, which should refer it elsewhere. Later Köhler [51] accredited the species to Berg, and described the female pupa as possessing a single strong anal hook—a character which placed it at the opposite end of his key from all the other species he assigned to *Platoeceticus.* Its true generic position remains for decision.

[50] C. R. Soc. Ent. Belg., XXXI, p. viii.
[51] Physis, XVII, pp. 462, 471; pl. 4, fig. 13, 1939.

Marona Schaus; *costaricensis* Schaus; *aphaidropa* Dyar. The exceedingly brief original descriptions of these insects give little clue to their generic relationships. The robust *costaricensis,* "Expanse 34 mm.," is in habitus widely at variance with the slender *Platoeceticus* of half that size; as identified in the British Museum, *costaricensis* has a long epiphysis on its fore tibia, and on both wings the median vein is forked within the cell—characters which remove it to a place remote from *Platoeceticus.* In its habitus, *marona* also is at variance with *Platoeceticus;* and Dyar's description of *aphaidropa* states that "venation as in *P. costaricensis* Schaus, except that vein 10 is stalked." Only critical examination of the types of these three insects, and preferably of associated examples, will place them conclusively.

Rebeli (Köhl.). In his original description Köhler referred this insect to *Chalia* Moore (an invalid genus), but in later references assigned it to *Platoeceticus* Pack. By his figure of its venation, showing A3 of fore wing not sending a spur toward the margin, Rs and Sc of hind wing joined by a bar, this insect does not belong to *Platoeceticus;* its sack, as illustrated, also seems divergent.

Rugosa Köhl.; *tandilensis* Köhl. These two names were based exclusively upon descriptions and illustrations of larval sacks—not insects, but fabrications made by insects, the insects themselves being unknown. Such names are of extremely doubtful validity,[52] and even if recognized as valid specifically, generic references cannot safely be based upon acquaintance with the sacks alone. This attitude toward these names was confirmed by Köhler himself, who upon opportunity to study adult males of *rugosa* found it necessary to transfer *rugosa* from *Platoeceticus* Pack. to *Prochalia* B. & McD. Apparently the uncertain status of the name *tandilensis* remains unchanged, though *rugosa* is unquestionably validated by this later action.

Hoffmanni Köhl. This name is based upon the description and illustration of a larval sack and a female pupa, no adult being known. The characters exhibited by the sack are not in full agreement with those of the known species of *Platoeceticus,* and the assignment of *hoffmanni* to that genus may or may not be confirmed, when adults are available for study. From the characters given, the correct association of reared material should not be difficult.

Chaquensis Köhl. Another species apparently known only from the sack and the female pupa, and to it the above remarks upon *hoffmanni* apply equally.

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[52] Recommendations concerning somewhat analogous instances are contained in the "Report of the British National Committee on Entomological Nomenclature" (Proc. Ent. Soc. Lond., III, pp. 1R–13R, 1928), in which Article 20 provides: "The Law of Priority also obtains and consequently the oldest name available is retained in the following cases . . . but this rule will not apply to names based upon galls and leaf-mines produced by insects, in the case of which the name given to the insect itself shall take precedence of the name given to the gall or mine, even if the latter is of earlier date."

In conclusion it may be pointed out that among the genera of the American Psychids, *Platoeceticus* does not stand alone in the nominal inclusion of incongruous elements, nor in the need for more explicit generic and specific definitions. That many species have been too casually described from unique specimens or from very few; that generic assignments have often been made on slight evidence or without regard to generic characters and limitations; that insects of this family are often most inadequately represented even in the larger collections: all these have contributed to difficulties and confusions which for their resolution require the study of large series of these insects of exceptional individual variability; and all of these causes contribute to the incompleteness of this attempted addition to the knowledge and literature of *Platoeceticus*.

Explanation of Figures

PLATE III

Antennae of *Platoeceticus* Packard, × 22

Fig. 1. *Platoeceticus gloverii* Packard.
Fig. 2. *Platoeceticus nigrita* Barnes & McDunnough.
Fig. 3. *Platoeceticus congregatus* new species
Fig. 4. *Platoeceticus watsoni* Jones

PLATE IV

Antennae of *Platoeceticus* Packard, × 50

Fig. 5. *Platoeceticus gloverii* Packard.
Fig. 6. *Platoeceticus nigrita* Barnes & McDunnough.
Fig. 7. *Platoeceticus congregatus* new species
Fig. 8. *Platoeceticus watsoni* Jones

PLATE V

Genitalia and furcate plates of *Platoeceticus* Packard, × 22

Fig. 9. *Platoeceticus gloverii* Packard.
Fig. 10. *Platoeceticus nigrita* Barnes & McDunnough.
Fig. 11. *Platoeceticus congregatus* new species
Fig. 12. *Platoeceticus watsoni* Jones

PLATE VI

Sacks of *Platoeceticus Packard, natural size*

Fig. 13. Clustered sacks of *P. congregatus,* new species. Morelos, Mexico, (A. Dampf).

Fig. 14. A weathered and bare sack of *P. gloverii* Packard from orange. Mississippi, (F. H. Benjamin).

Fig. 15. The once nearly smooth sack of an orange-feeding larva of *P. gloverii* Packard, which when transferred to arbor-vitae ornamented its sack with fragments of that plant. Mississippi, (F. H. Benjamin).

Fig. 16. Sack of larva of *P. gloverii* Packard which had preyed upon scale-insects. New Orleans, La., (F. M. Jones).

Fig. 17. Sack of larva of *P. gloverii* Packard, from Crepe-myrtle. New Orleans, La., (F. M. Jones).

Fig. 18. Bare and decorated sacks of *P. gloverii* Packard, attached to same twig. Key West, Fla., (F. M. Jones).

Figs. 19–24. Sacks of *P. nigrita* (Barnes & McDunnough), showing degrees of exterior ornamentation. From various Florida and Alabama localities, (F. M. Jones).

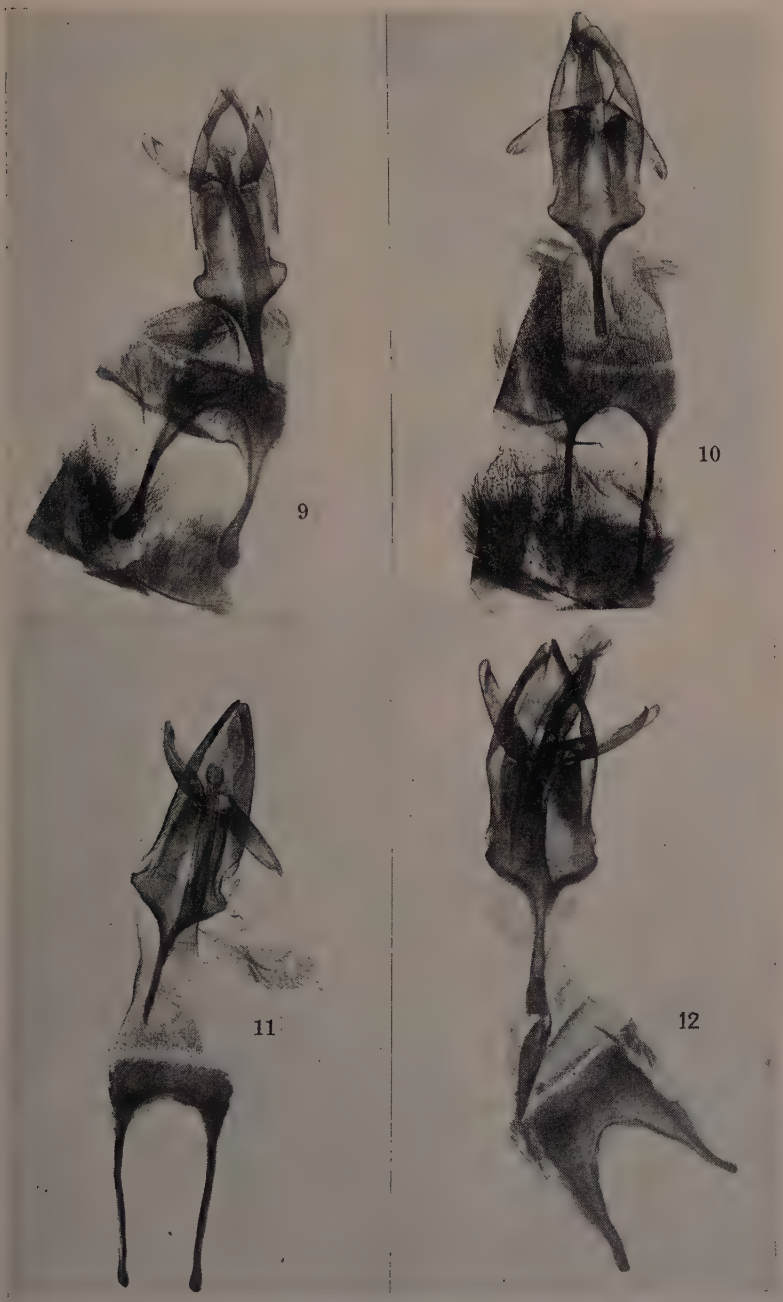
Figs. 25–27. Sacks of *P. watsoni* Jones. Haiti, (F. E. Watson).

Figs. 28–30. Sacks of unidentified Psychid, resembling those of *Cryptothelea macleayi Guild.* Jamaica, (E. L. Bell).

Transactions of The American Entomological Society, Vol. LXXI.
Pages 99–124. September 26, 1945.

JONES—PLATOECETICUS

JONES—PLATOECETICUS



JONES—PLATOECETICUS

JONES—PLATOECETICUS

TWO NEW NEMOCERA DIPTERA[1]

(SCIARIDAE AND CECIDOMYIDAE)

BY WILLIAM F. RAPP, JR.

University of Illinois, Urbana, Illinois

(Two text-figures)

The two new species of Diptera described in this paper were taken by Mrs. Janet L. C. Rapp in debris run through a Berlese funnel while gathering material for her master's thesis. All of the types will be deposited in the collection of the Academy of Natural Sciences of Philadelphia. I am greatly indebted to Dr. Hung Fu Chu for making the drawing of the two specimens.

Family Sciaridae

Two specimens of Sciaridae were taken and it was soon found that they were both the same species. After a careful study it was decided that they represented a new genus. The following key to genera is a modification of Curran's [2] key.

Key to North American Genera of the Family Sciaridae

1. Proboscis longer than the thorax.....*Eugnoriste* Coquillett
   Proboscis not greatly elongate.....2
2. Wings conspicuously hairy; claws never denticulate..*Trichosia* Winnertz
   Wings with microscopic setulae but not hairy.....3
3. Claws toothed.....4
   Claws not toothed.....5
4. Forks of the fourth vein arcuate.....*Metangela* Rubsaamen
   Forks of the fourth vein not arcuate.....*Phorodonta* Coquillett
5. Face strongly produced.....*Rhynchosciara* Rubsaamen
   Face not produced.....6
6. Forks of the fourth vein arcuate; antennae of the male pedicellate and with whorls of hair.....*Zygoneura* Meigen
   Forks of the fourth vein not arcuate; antennae never pedicellate.....7
7. Forks of the fourth vein present.....*Sciara* Meigen
   Forks of the fourth vein absent.....*Niadina* gen. nov.

[1] Contribution No. 254 from the Department of Entomology, University of Illinois, Urbana, Illinois.

[2] Curran, C. H., 1934, North American Diptera, p. 119.

NIADINA new genus *

This genus is closely related to the genus *Sciara* Meigen, but differs in that it lacks the anal vein and the media. If we consider the dropping of wing veins as an indication of a high phylogenic position, *Niadina* represents the peak of specialization in Sciaridae.

Head small; proboscis short; palpi 4-jointed, the first very short and not easily differentiated from the second; antennae 14-jointed, males have holoptic compound eyes; three ocelli. Thorax moderately arched. Legs slender, two tibial spurs; tarsal claws not toothed. Wings microscopically setulose, not hairy, anal veins absent and media vein absent, but M_1 and M_{2+3} present (fig. 1a). Halteres very large.

GENOTYPE: *Niadina jauva* new species.

Niadina jauva new species

Male.—Length 1.75 mm. Brownish yellow, including palpi. Halteres yellowish opaque. Sternites light yellowish brown, separated from the brownish yellow tergites by the darker pleurites. Hypopygium brownish yellow, composed of four segments, claspers articulated from the 9th segment, claspers two-segmented (fig. 1c). Wings hyaline; veins dark brown, anal and media missing (fig. 1a). First antennal segment about twice the size of the others.

Type.—Male; St. Joseph, Champaign County, Illinois; February 11, 1945; (J. L. C. Rapp); [A.N.S.P. No. 6676].

Paratype.—1♂; Champaign, Champaign County, Illinois; February 4, 1945; (J. L. C. Rapp); [A.N.S.P.].

The type was taken in a sample of loose dead leaves under a willow tree growing along the bank of the Salt Fork River near St. Joseph. The paratype was taken in a small nursery on the University Farm near the Illinois Central Railroad south of the town of Champaign.

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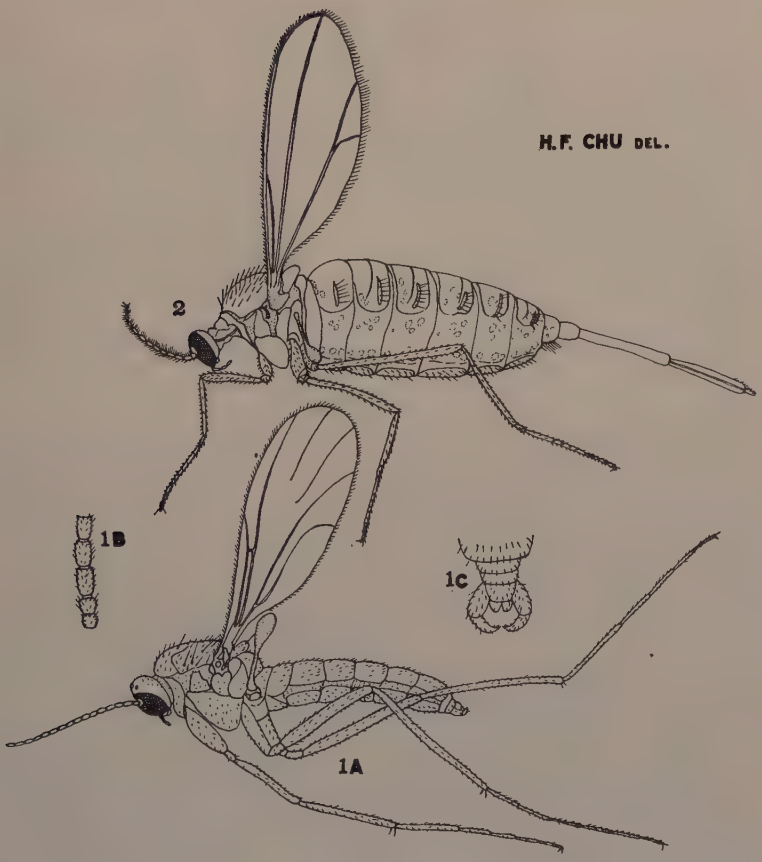
* *Niadina*—an anagram.



Text-figure 1a. *Niadina jauva* new species. Fig. 1b. Basal segment of antenna. Fig. 1c. Genital segment.

Text-figure 2. *Epourenia viva* new species.

Family Cecidomyidae

This species of Cecidomyidae belongs in the tribe Heteropezinae and in Felt's [3] key to genera, it keys to the genus *Ledomyiella* Meun., a genus known only from old world amber.

[3] Felt, E. P. Key to Gall Midges, N. Y. State Museum Bulletin No. 257, p. 138.

EPOURENIA new genus [4]

Epourenia is closely related to *Ledomyiella* Meun. It differs mainly in the structures of the antennae. Since this species keys out in Felt's key it is not necessary to give a key to genera, but it should be kept in mind that *Ledomyiella* is from amber and *Epourenia* is not.

Female.—Length 3 mm. Antennae about as long as head and thorax, sparsely haired, dark brown; 13 segments, all segments the same shape. Metatarsus shorter than second tarsal segment; pulvilli slightly longer than the claws. Wings hyaline, with three veins, Cu divided into Cu_1 and Cu_2. Ovipositor slender, compared to abdomen; length almost about as long as the abdomen.

GENOTYPE: *Epourenia viva* new species.

Epourenia viva new species

Female.—Length 3 mm. Antennae about as long as head and thorax, 13 segments, all ovate in shape. Four palpi. Mesonotum dark brown, scutellum and postscutellum the same. Abdomen almost white, with small dark markings (fig. 2). Wings hyaline, veins dark brown, subcosta difficult to distinguish, uniting with costa near the middle. Halteres dark brown. Legs light brown; metatarsus short, the second segment, more than twice the length of the metatarsus; the pulvilli slightly longer than the claws. Ovipositor about as long as the abdomen, slender.

Type.—Female; Mahomet, Champaign County, Illinois; March 4, 1945; (J. L. C. Rapp); [A.N.S.P. No. 6677].

The type was taken in a sample of litter from the forest floor of the flood plain along the Sangamon River.

[4] *Epourenia*—an anagram.

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A SYSTEMATIC ANNOTATED ARRANGEMENT OF THE GENERA AND SPECIES OF THE NEOTROPICAL EPHYDRIDAE (DIPTERA)

I. The Subfamily Psilopinae

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In the course of my studies of the North American species of this family, I have also examined material from other parts of the world. Particularly interesting were those species from the Neotropical, African and Indo-Australian regions. Comparatively little or no revisionary work has been done on the species of these regions; in fact many have not been recognized since they were originally dsecribed, and no recent catalogue or list of the genera and species has been published.

In order that future students of the Neotropical species will have what may be termed a systematic catalogue or list of these species, the present series, of which this is the first, is prepared.[1] In this work I endeavor to include all the species heretofore described as belonging to the family, and to assign them to their respective places in my arrangement; together with those I have described in the course of these studies. Those I have not recognized are placed by characters gleaned from their original descriptions, or as placed by their authors, or by other students whom I consider qualified to do so. Some species are so inadequately described that I cannot determine their affinity and these are, consequently, retained in their original genera.

For the material which has made this work possible, besides that in the collection of the Academy of Natural Sciences of Philadelphia [ANSP], I am indebted particularly to the authorities of

[1] The Psilopinae of the Indoaustralian Region was published in these Transactions, LXXI, pp. 47–75, 1945.

the American Museum of Natural History, New York [AMNH], California Academy of Sciences, San Francisco [CAS], Deutsches Entomologisches Institut, Berlin-Dahlem [DEI], Imperial Institute of Entomology, London [IIE], Illinois State Natural History Survey, Urbana [INHS], Instituto Oswaldo Cruz, Rio de Janeiro [IOC], University of Kansas, Manhattan [KU], Musee National Hungrois, Budapest [MNH], Museum of Comparative Zoology, Cambridge, containing the Loew Collection [MCZ], United States National Museum, Washington [USNM]; also to the late Charles W. Johnson [Johns], and Dr. A. L. Melander, Riverside, California [Mel].

General localities previously recorded for the species are given with the bibliographical references. Additional records, given in detail, are of the material before me at this writing. Thus the known distribution can be readily ascertained.

As regards the Neotropical species, no comprehensive works nor catalogues have been published on the species of this region as a whole. Only a few faunal lists or small faunistic papers describing new forms have appeared, among which may be mentioned the following:

1896. On the Diptera of St. Vincent (West Indies). By S. W. Williston.[2]
1919. Revised List of the Diptera of Jamaica. By C. W. Johnson.[3]
1928. Insects of Porto Rico and the Virgin Islands. I. Diptera. By C. H. Curran.[4]
1931. Diptera of Patagonia and South Chile. Ephydridae. By E. T. Cresson.[5] Supplement by F. W. Edwards.

Because comparatively few of the early students, who had little knowledge of the characteristics of the Ephydridae, have described species from the Neotropics, we do not have the number of inadequately characterized species to deal with, as we find is the case with the Indo-Australian fauna. This fact is well illustrated by the few unrecognized species I have noted in my remarks under Psilopinae, and this ratio will be approximately maintained in the other subfamilies.

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[2] Trans. Ent. Soc. London, 1896, pp. 253–446, pls. 8–14.
[3] Bull. Amer. Mus. Nat. Hist., XLI, pp. 421–449.
[4] Sci. Surv. P. Rico & Virg. Isls., XI, pp. 1–118.
[5] Bnt. Mus. Publication.

Subfamily Psilopinae

Psilopinae Cresson, Trans. Amer. Ent. Soc., LI, p. 241, 1925. Psilopinae Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 102, 1942.

This is a large, well marked group, and also is abundantly represented in the Neotropical Region. In the present treatise seventy-one species are recognized in the material now before me, and eleven unknown to me are included. Key to the genera and to most of the species are given and in many instances the salient features of the species are noted.

The species of this subfamily are very small (1 mm.) to medium size (2.5 mm.), with the head more or less disciform, circular or subelliptical in cephalic aspect, rarely broadest far above its transverse centerline; eyes rarely round and protruding; frontal (if present) reclinate; median facies bare, the facialia and facial series of setae practically parallel to concentric with the orbits, not converging dorsad to meet at the interfoveal carina; mouth generally narrow with distinct clypeus, never with oral cilia; dorsocentrals absent, but posterior intra-alar and generally the prescutellars, present; supra-alar rarely present.

Key to the Tribes of the Neotropical Subfamily Psilopinae

1. Setation usually very much reduced; postbucca bare, extensive, with posterior margin sharp and usually reflexed or marginated; facialia usually pitted or rugulose, the facials situated in such depressions; antennae always simple, with arista sometimes bare.....*Gymnopini*
   Setation well developed (except in the Discomyzini, which has the frons and face sculptured); if postbucca is extensive it is setulose and the posterior margin is not reflexed; facialia not noticeably sculptured (except in the Discomyzini and in the genus *Leptopsilopa*); facials may be situated on papillae but not in depressions.....2
2. Posterior notopleural distinctly removed dorsad from the notopleural suture, sometimes well into the sutural angle; mostly opaque pruinose species.....*Atissini*
   Posterior notopleural at or near the notopleural suture, horizontally aligned with the anterior notopleural.....3
3. Ocellars situated cephalad of the line of the anterior ocellus; antennae of the *Gymnopa* type; mostly opaque pruinose species.....*Discocerinini*
   Ocellars situated caudad of the anterior ocellus, sometimes between the posterior ocelli; antennae usually of the *Notiphila* type, with distinct superior marginal bristle; mostly shining to polished species.....4

4. Frons and face distinctly sculptured; three or more facials present and well removed from the parafacies; setation weakly developed; mesonotal setulae not seriated.....*Discomyzini*
Frons and face at most weakly sculptured medianly; rarely more than two facials present which are usually near the parafacies; setation well developed; mesonotal setulae usually distinctly seriated.....*Psilopini*

ATHYROGLOSSA

1860. *Athyroglossa* Loew, Neue Beitr., VII, p. 12.
1896. *Ochtheroidea* Williston, Trans. Ent. Soc. London, 1896, p. 401.
1944. *Athyroglossa,* Cresson, Trans. Amer. Ent. Soc., LXX, p. 160. Synonymy of *Ochtheroidea.*

Tribe GYMNOPINI

1942. Gymnopini Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 103.

Athyroglossa granulosa (Cresson)

1922. *Ochtheroidea granulosa* Cresson, Trans. Amer. Ent. Soc., XLVII, p. 341. [United States.]

VIRGIN ISLANDS: Caanan, XII 10, (H. A. Beatty), [USNM, 1]. GRENADA: [USNM, 1].

A Nearctic species ranging into the West Indies.

Athyroglossa dubia (Williston)

1896. *Discomyza dubia* Williston, Trans. Ent. Soc. London, 1896, p. 392, pl. 12, fig. 138 wing, 138a head in profile. [St. Vincent.]
1908. *Discomyza dubia* Williston, Man. No. Amer. Dipt., (3), p. 304, fig. 12 head profile.
1939. [*Athyroglossa dubia*], Cresson, Notulae Nat., no. 21, p. 2. Suggest synonymous with *A. atra* (Williston).

That this species belongs to *Athyroglossa* rather than to *Discomyza* is sustained by the figure of the head, no mention having been made of facial sculpturing nor of wing maculation. That it may be conspecific with *atra* is not improbable, but this possibility is not confirmed by its description. However, Dr. C. H. Curran has kindly compared the "cotypes" of *dubia,* in the collection of the American Museum of Natural History, with specimens of *atra,* and found them to agree. On the other hand as these "cotypes" of *dubia* do not entirely fit Williston's description, it is not improbable that these "cotypes" are not conspecific with the "type" of *dubia,* presumably in the British Museum (Natural History). Therefore I hesitate to consider the synonymy of *dubia* and *atra.*

Athyroglossa atra (Williston)

1896. *Ochtheroidea atra* Williston, Trans. Ent. Soc. London, 1896, p. 401. [St. Vincent.]

1918. *Ochtheroides atra,* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 60. [Panama.]

1922. *Ochtheroidea atra,* Cresson, Trans. Amer. Ent. Soc., XLVII, p. 337. [Panama, Trinidad, British Guiana.]

1928. *Discomyza dubia,* Curran, Sci. Surv. P. Rico & Virg. Isls., XI, (1), p. 62. [St. Thomas, Puerto Rico, St. Croix.]

BRITISH HONDURAS: Manatee, [DEI, 1]. GUATEMALA: Esmeralda, I 5, [INHS, 1]. HONDURAS: Puerto Castilla, IV 4, (R. H. Painter), [ANSP, 1]. COSTA RICA: Higuito, San Mateo, (Pablo Schild), [USNM, 1]. La Suiza, IX 23, (P. Schild), [Mel, 2]. Surubres, 300 ft. alt., (A. Heyne), [DEI, 3]. PANAMA: Fijoles, Canal Zone, X 23, [USNM, 1].

A well distributed Neotropical species. See remarks under *A. dubia* (Williston).

Athyroglossa sulcata (Hendel)

1930. *Ochtheroidea sulcata* Hendel, Konowia, IX, p. 139. [Bolivia.]

I do not know this species, it is said to be similar to *atra.*

Athyroglossa laevis (Cresson)

1918. *Ochtheroidea laevis* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 61. [Costa Rica.]

1922. *Ochtheroidea laevis* Cresson, Trans. Amer. Ent. Soc., XLVII, p. 339. [Costa Rica, Cuba, Puerto Rico.]

1928. *Ochtheroidea laevis* Cresson, Sci. Surv. P. Rico & Virg. Isls., XI, (1), p. 63. [Puerto Rico.]

VIRGIN ISLANDS: Caanan, XII 22; Estate Fountain, St. Croix, VII; (all H. A. Beatty); [all USNM, 13]. COSTA RICA: Higuito, San Mato, (Pablo Schild), [USNM, 1]. La Suiza de Turrialba, (Pablo Schild), [Mel, 8]. BRAZIL: Nova Fri Burgom, Est. do Rio, IV 22, (S. Lopez), [IOC, 3]. BOLIVIA: Tumupasa, (W. M. Mann), [USNM, 1].

Not always easily separated from *glaphyropus,* and may not be distinct. It is more shining, the mesonotum and particularly the scutelum is scarcely minutely sculptured; the latter broad, almost rectangular and very convex; face slightly broader and more convex.

Athyroglossa glaphyropus Loew

1878. *Athyroglossa glaphyropus* Loew, Zeits. f. Gesam. Naturw., LI, p. 197. [United States.]

1918. *Ochtheroidea glaphyropus,* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 61. [Costa Rica.]

1922. *Ochtheroidea glaphyropus,* Cresson, Trans. Amer. Ent. Soc., XLVII, p. 340. [Costa Rica, Bolivia.]

1938. *Athyroglossa glaphyropus,* Cresson, Rev. de Entom., VIII, p. 25. [Brazil.]

COSTA RICA: Higuito, San Mateo, (Pablo Schild), [USNM, 26]. San Jose, V to XI, (H. Schmidt), [USNM, 27]. PANAMA: Juan Mina, Canal Zone, VIII 25; Pedro Miguel, Canal Zone, IV 10; Monte Lirio, IV 6–15; (all R. C. Shannon); [all USNM, 7]. PERU: Inquitos, III–IV, (R. C. Shannon), [USNM, 1].

This may be *laevis,* but the series so far examined do not bear out this supposition. However, the two are not always easily separated.

Athyroglossa similis (Cresson)

1918. *Ochtheroidea similis* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 61. [Costa Rica.]

1922. *Ochtheroidea similis* Cresson, Trans. Amer. Ent. Soc., XLVII, p. 338.

COSTA RICA: Higuito, (Pablo Schild), [USNM, 2]. PANAMA: Upper Pequeni River, III 21, (A. H. Jennings), [USNM, 5].

Athyroglossa fascipennis (Cresson)

1918. *Ochtheroidea fascipennis* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 60. [Colombia.]

1922. *Ochtheroidea fascipennis* Cresson, Trans. Amer. Ent. Soc., XLVII, p. 336, pl. 20, fig. 10. [Panama.]

1938. *Athyroglossa fascipennis* Cresson, Rev. de Entom., VIII, p. 25. [Brazil.]

COSTA RICA: Higuito, San Mateo, (Pablo Schild), [USNM, 2]. La Suiza, VI 24, VII, (Pablo Schild), [Mel, 2]. VENEZUELA: San Esteban, XI, (P. Anduse), [USNM, 1]. PERU: Iquitos, III–IV, (R. C. Shannon), [USNM, 1].

Athyroglossa borrosi Brethes

1919. *Athyroglossa borrosi* Brethes, Rev. Chile. Hist. Nat., XXII, p. 44. [Chile.]

I do not know this species. The indecisive description does not place it among the known Gymnopini.

PARATHYROGLOSSA

1931. *Parathyroglossa* Hendel, Bull. Soc. R. Ent. Egypte, xv, p. 68.

Parathyroglossa centralis (Cresson)

1918. *Ochtheroidea centralis* Cresson, Trans. Amer. Ent. Soc., xliv, p. 60. [Costa Rica.]
1922. *Ochtheroidea centralis* Cresson, Trans. Amer. Ent. Soc., xlvii, p. 336. [Mexico, Cuba, Porto Rico, Colombia, British Guiana.]
1928. *Ochtheroidea centralis,* Curran, Sci. Surv. P. Rico & Virg. Isls., xi, (1), p. 63. [Puerto Rico.]
1931. *Athyroglossa centralis,* Hendel, Konowia, ix, p. 140. [Bolivia.]

Puerto Rico: Fijado, II; Vieques Island, II, (all A. Busck); [all USNM, 3].

This is a totally shining species, the sparse mesonotal vestiture in no way obscures the surface gloss. The tibiae are dark; the mesonotum is somewhat sculptured, with the setulae irregular, or in very close series.

Parathyroglossa tectora (Cresson)

1926. *Athyroglossa tectora* Cresson, Trans. Amer. Ent. Soc., lii, p. 249. [Peru.]

This species is known to me only by the unique type.

The mid and hind tibiae are pale and the mesonotum is rather densely brown pollinose medianly.

CEROMETOPUM

1914. *Cerometopum* Cresson, Entom. News, xxv, p. 241.
1922. *Cerometopon* Cresson, Trans. Amer. Ent. Soc., xlvii, p. 342. Error for *Cerometopum.*

Cerometopum mosilloides Cresson

1914. *Cerometopum mosilloides* Cresson, Entom. News, xxv, p. 242, pl. 10, fig. 3. [Colombia, Paraguay.]

Wing veins pale, third and fourth veins somewhat converging; posterior crossvein not infuscated; alula broad, auriculate.

Cerometopum lacunosum Cresson

1925. *Cerometopum lacunosum* Cresson, Entom. News, xxxvi, p. 165. [Costa Rica.]

Wing veins dark; third and fourth parallel; crossvein sometimes infuscated; alula narrow.

GYMNOPA

1820. *Gymnopa* Fallen, Dipt. Suec., Oscin., p. 10.

Gymnopa tibialis (Cresson)

1916. *Mosillus tibialis* Cresson, Entom. News, XXVII, p. 149. [United States.]

1922. *Gymnopa tibialis* Cresson, Trans. Amer. Ent. Soc., XLVII, p. 329, pl. 20, figs. 1, 4, 5. [Yucatan, Bermuda.]

1923. *Gymnopa tibialis,* Cole, Proc. Cal. Acad. Sci., (4), XII, p. 478. [Baja California.]

BERMUDA ISLANDS: St. George, II 3, (A. L. Melander), [Mel, 1]. BAJA CALIFORNIA: Mulege, IV 14, (E. P. VanDuzee), [USNM, 4]. MEXICO: Oaxaca, VIII 30, (L. O. Howard), [USNM, 1]. GUATEMALA: Alta Vera Pas., Coban, V 14, (J. M. Aldrich), [USNM, 1].

Key to the Neotropical Species of the Tribe Gymnopini

1. Alula narrow, inferior margin scarcely convex.....3
   Alula broad, auriculate, with strongly convex inferior margin.....2
2. Arista bare or pubescent; medifacies smooth
   Gymnopa tibialis (Cresson)
   Arista pectinate, with long dorsal hairs; face rugulose
   Cerometopum mosilloides Cresson
3. Face subhemispherically or conically tumid, in profile prominent medianly.....10
   Face evenly convex, not prominent in profile or if prominent the convexity is transverse the full width of the medifacies.....4
4. Face entirely pitted or rugose, the facialia scarcely discernible
   Cerometopum lacunosum Cresson
   Face not uniformly rugulose or pitted (*Athyroglossa*).....5
5. Halteres black or dark.....**Athyroglossa granulosa** (Cresson)
   Halteres pale, yellow to white.....6
6. Abdominal dorsum flat; fore metatarsus white
   Athyroglossa atra (Williston)
   Abdominal dorsum and scutellum convex.....7
7. Wings infuscated medianly and apically; fore metatarsus black
   Athyroglossa fascipennis (Cresson)
   Wings immaculate.....8
8. Face broad, almost four time width of antenna III; mesonotum and scutellum more or less granulose and brown pollinose; cheeks broad, .5 eye-height.....**Athyroglossa similis** (Cresson)
   Face narrow, scarcely more than twice width of antenna III; cheeks narrow about .25 eye-height.....9
9. Mesonotum and scutellum granulose, distinctly brown pollinose; face scarcely visible in profile....**Athyroglossa glaphyropus** Loew

Mesonotum polished, at most sparsely pollinose; face subglobose, quite prominent in profile.....**Athyroglossa laevis** (Cresson)

10. Mid and hind tibiae yellow with anterior surface niveous
Parathyroglossa tectora (Cresson)

All tibiae except apices black, not niveous
Parathyroglossa centralis (Cresson)

Tribe Atissini

1942. Atissini Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 103.

HECAMEDE

1839. *Hecamede* Haliday, An. Nat. Hist., III, p. 224.
Hecamede brasiliensis Cresson, Rev. de Entom., VIII, p. 25. [Brazil.]

This species has two frontorbitals of which the anterior one is well advanced, almost aligned with the lunular margin.

Known only by the type series from Rio de Janeiro.

PSEUDOHECAMEDE

1936. *Pseudohecamede* Hendel, Ann. Naturh. Mus. Wien, XLVII, p. 104.

Pseudohecamede abdominalis (Williston)

1896. *Hecamede abdominalis* Williston, Trans. Ent. Soc. London, 1896, p. 398. [St. Vincent.]
1897. *Allotrichoma abdominalis* Williston, Kans. Univ. Quart., VI, p. 4. [Brazil.]
1900. *Allotrichoma abdominalis,* Coquillett, Proc. U. S. Nat. Mus., XXII, p. 260. [Puerto Rico.]
1918. *Allotrichoma abdominalis,* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 54. [Costa Rica.]
1931. *Allotrichoma abdominalis,* Hendel, Konowia, IX, p. 135. [Bolivia.]
1937. *Pseudohecamede abdominalis,* Hendel, Ann. Naturh. Mus. Wien, XLVII, p. 108. [Paraguay.]

Puerto Rico: San Juan, I 25, (A. S. Mills); Utuado, I, (A. Busck); [all USNM, 2]. Mexico: Esperanza, XI 8; Minatillan, II, (H. Osborn); [USNM, 2]. Honduras: Puerto Castilla, VI 19, (H. R. Painter); [ANSP, 1]. Panama: Fort Clayton, IV 22, (R. C. Shannon); Trinidad Rio, VI 8, (A. Busck); [all USNM, 3]. Peru: Matucana, VI 1, (C. T. Brues), [USNM, 1]. Bolivia: Piedra Blanca, IV, [Mel, 1]. Rosario Lake, Rogagua, X 28–XI 9, (W. M. Mann; Mulford Expedition), [USNM, 1]. Paraguay: San Bernardino, II–III, (Babarczy), [MNH, 2].

Pseudohecamede facialis Hendel

1936. *Pseudohecamede facialis* Hendel, Ann. Naturh. Mus. Wien, XLVII, p. 105. [Brazil.]

This is probably a variety of *abdominalis*. I have not recognized it in the material before me.

Pseudohecamede salubris (Cresson)

1930. *Allotrichoma salubris* Cresson, Entom. News, XLI, p. 78. [Brazil.]
1936. *Pseudohecamede nasalis* Hendel, Ann. Naturh. Mus. Wien, XLVII, p. 104. [Paraguay.]

The synonymy of *nasalis* is new. I have seen a number of both sexes of this species from Chaco, Paraguay, and two individuals labelled Montevideo to Salto & Concordia, Argentina, III 6–14, (H. L. Barker), [USNM].

DIPHUIA

1944. *Diphuia* Cresson, Notulae Nat., no. 135, p. 3.

Diphuia anomala Cresson

1944. *Diphuia anomala* Cresson, Notulae Nat., no. 135, p. 4. [Panama.]

PANAMA: Monte Lirio, IV 6, and 15, (R. C. Shannon), [USNM, 30]. Topotypes and those with date IV 6, were taken with type. Pedro Miguel, Canal Zone, IV 10, (R. C. Shannon), [USNM, 1].

A shining black species with niveous striped face, and which may easily be mistaken for *Discocerina nitida* Cresson. But here we have the posterior notopleural situated well dorsad from the suture, a characteristic feature of the tribe Atissini.

ATISSA

1839. *Atissa* Haliday, An. Nat. Hist., III, p. 404.

Atissa mimula Cresson

1931. *Atissa mimula* Cresson, Dipt. Pat. & So. Chile., VI, p. 92. [Argentina.]

May be recognized by the convex, lower part of the face, with receding epistomal margin.

Atissa luteipes new species

Similar to *A. mimula,* but the legs are entirely yellow and the cheeks are almost linear. The mesonotal setulae are in four series

between the intra-alars. Crossveins not clouded. Face about as broad as long, rather sharply prominent at epistoma. Length, .88 to 1 mm.

Type.—Female? Puerto Castilla, Honduras; April 24, 1926; (R. H. Painter); [A. N. S. P., no. 6666].

Paratypes.—2 ♂? from same locality; April 22 and 26, 1926.

ATISSIELLA

1918. *Atissiella* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 55.

Atissiella setulosa Cresson

1918. *Atissiella setulosa* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 55, pl. 3, fig. 9. [Costa Rica.]

The original is a composite description, applying equally well to an individual from Pennsylvania, United States,[6] as it does to the type from Costa Rica. In consequence the following, more detailed description of the type is given.

Pale, yellow to ferruginous; antenna III sometimes basad, base of hind tarsi, and halteres. Wings immaculate, brownish, in certain aspects reflecting light areas with metallic colors, especially along the costa and veins.

Subopaque, brownish to ochraceous; frons more overcast; face and pleura scarcely lighter. Abdomen almost shining.

Frons transverse, about .6 width of head; postocellars absent or indiscernible; reclinate orbital close to orbit, nearly as close as are the advanced frontal. Face short, about as broad as long; carina with median nose-like hump; the two facials in series near oral margin; also a series of three to four fine, rather ventro-laterally inclined setulae in parafacies groove. Cheek linear. Antennae above center-line of eyes; arista with five hairs.

Mesonotum almost destitute of setulae but with an acrostichal and a dorsocentral seta in the sutural region, constituting a transverse series of four setae almost in line with the well developed supra-alars; the prescutellar pair, intra-alar and post-alar are almost equally as strong.

Wings moderately long, slightly pointed at vein III; costa slightly cleft at vein I, and section II of costa about .6 length of III. Length, .09 to 1 mm.

Atissiella mabelae Cresson

1926. *Atissiella mabelae* Cresson, Trans. Amer. Ent. Soc., LII, p. 253. [United States.]

A series of four teneral specimens from Puerto Castilla, Honduras, IV 22, 24, 27, 1926, (H. R. Painter), appears to be conspecific with the type of this species from Pennsylvania.

[6] This individual from Pennsylvania (Trans. Amer. Ent. Soc., LII, p. 254, 1926) was a misidentification, and has since been described as a distinct species.

ALOCATISSA

1930. *Alocatissa* Hendel, Konowia, IX, p. 134.

This genus is certainly closely related to *Atissiella* if not synonymous.

Alocatissa linderi Hendel

1930. *Alocatissa linderi* Hendel, Konowia, IX, p. 135. [Argentina.]

BOLIVIA: Rosario Lake, Rogagua; X 8 to XI 9; (W. M. Mann; Mulford Expedition, 1921–1922); [USNM, 4].

The above series is poorly preserved, but seems to be of this species. If this is so, there is no doubt as to the synonymy of *Alocatissa* and *Atissiella*.

Key to the Neotropical Species of the Tribe Atissini

1. Face pollinose, with prominent shining median tubercle; cheeks extensive, setulose; mesofrons setulose, without paired ocellars; eyes round; scutellum with more than 4 marginals **Hecamede brasiliensis** Cresson
   Face may be conically prominent medianly, but without shining tubercle; mesofrons not setulose; scutellum with only 4 marginals..2
2. Frontals about aligned with ocellars, the latter cephalad of anterior ocellus.....6
   Frontals cephalad of line of ocellars, the latter caudad of line of anterior ocellus.....3
3. Face conically prominent above epistoma, with a median pair of upcurved setae (*Atissiella*).....5
   Face most prominent near epistoma, without median pair of upcurved setae (*Atissa*).....4
4. Cheeks broad equalling width of antenna III; legs dark, with pale tarsi.....**Atissa mimula** Cresson
   Cheeks almost linear, scarcely .5 width of antenna III; legs entirely pale.....**Atissa luteipes** Cresson
5. Wings with faint subbasal, subapical, and posterior crossvein clouds **Atissiella mabelae** Cresson
   Wings immaculate.....**Atissiella setulosa** Cresson
6. Proboscis normal; shining species; face with niveous spots and lines; shining black species.....**Diphuia anomala** Cresson
   Proboscis slender, geniculate, bent caudad; opaque species; face not maculate (*Pseudohecamede*).....7
7. Mesopleura brown.....**Pseudohecamede abdominalis** (Williston)
   Pleura uniformly cinereous.....**Pseudohecamede salubris** (Cresson)

Tribe DISCOCERININI

1942. *Discocerinini* Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 104.

HYDROCHASMA

1936. *Hydrochasma* Hendel, Ann. Naturh. Mus. Wien, XLVII, p. 101.

Hydrochasma capax Cresson

1938. *Hydrochasma capax* Cresson, Rev. de Entom., VIII, p. 26. [Guatemala.]

In this species the tibiae are for the most part pale.

Hydrochasma patens Cresson

1938. *Hydrochasma patens* Cresson, Rev. de Entom., VIII, p. 27. [Uruguay.]

This is very similar to *capax,* but the tibiae are dark, cheeks narrower and there is no postflexor series of setae on fore femur.

Hydrochasma ceraceps (Cresson)

1938. *Hecamedoides ceraceps* Cresson, Rev. de Entom., VIII, p. 27. [Brazil.]

Hydrochasma zernyi Hendel

1936. *Hydrochasma zernyi* Hendel, Ann. Naturh. Mus. Wien., XLVII, p. 103, fig. 5. [Brazil.]

This is the genotype of *Hydrochasma.* I have not seen it.

Hydrochasma leucoprocta (Loew)

1861. *Discocerina leucoprocta* Loew, Berl. Ent. Zeits., v, p. 355; (Cent., I, p. 49, no. 93). [United States.]

1942. *Hydrochasma leucoprocta,* Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 113. Generic change.

GUATEMALA: Antigua, IV 2, (J. M. Aldrich), [USNM, 1]. PANAMA: Fort Clayton, IV 23, (R. C. Shannon), [USNM, 1]. BOLIVIA: Huachu Beni, IX 21, (W. M. Mann), [USNM, 2].

This species was originally described from the eastern United States and here recorded for the first time from the neotropics.

The species, as here differentiated from the true neotropical *incisa,* has the abdomen velvety-black with the lateral margins and ventral lobes cinereous; the fifth tergite may be entirely cinereous, but the cinereous color does not encroach onto the dorsum of the other tergites as wedges which is so characteristic of *incisa.*

Hydrochasma incisa (Coquillett)

1902. *Discocerina incisa* Coquillett, Jour. N. Y. Ent. Soc., x, p. 182. [Puerto Rico.]
1918. *Discocerina leucoprocta* subsp. *incisa,* Cresson, Trans. Amer. Ent. Soc., xliv, p. 58. [Costa Rica.]
1928. *Discocerina leucoprocta incisa,* Curran, Sci. Surv. P. Rico & Virg. Isls., xi, (1), p. 62. [Puerto Rico.]
1930. *Discocerina* (*Gymnoclasiopa*) *poecilogastra* Hendel, Konowia, ix, p. 138. [Bolivia.]
1938. *Discocerina incisa* Cresson, Rev. de Entom., viii, p. 29. [Paraguay.]
1942. *Hydrochasma incisa* Cresson, Trans. Amer. Ent. Soc., lxviii, p. 113. [Bolivia.]

West Indies: St. Vincent, [KU, 1]. Puerto Rico: Coamo Springs, VII 17–19; Mayaguez, II 15–16; Manati, VI 27–29; San Juan, II 11–14; [all AMNH, 4]. Jamaica: Battersea, II, (R. Thaxter), [Mel, 1]. Mexico: Tamaulpias—Tampico, XIII 6; Victoria, XII 10; (all F. C. Bishopp), [all USNM, 2]. Tabasco—Frontera, III 9, (C. H. T. Townsend), [USNM, 1]. Panama: Porto Bello, II 15; Tabernilla, Canal Zone, II 6; Trinidad River, C. Z., IV 10; (all A. Busck), [all USNM, 18]. Fort Clayton, IV 23; Pedro Miguel, C. Z., IV 10; (all R. C. Shannon), [all USNM, 3]. Brazil: Rio de Janeiro—Gavea, III 3; Rio de Janeiro, IX; (all H. S. Lopez), [all IOC, 4]. Bolivia: Huachi Beni, X 21, (R. C. Shannon), [USNM, 17].[7]

A well distributed Neotropical species possessing great variation in the color and width of the face and apparently in the development of the male genitalia. There appears no doubt but that the series here recorded represents a different species from *leucoprocta.* The face is more elongate, darker in color and the male genitalia are larger, the genital segment more obtuse at apex. The species may be readily recognized by the definite lateral cinereous wedges of the velvety-black abdomen.

Johnson's record of *leucoprocta* from Jamaica[8] probably should be referred to this species.

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[7] My record of 1938 for Piedro Blanco should have been Bolivia, not Brazil.
[8] Bull. Amer. Mus. Nat. Hist., xli, p. 447, 1919.

POLYTRICHOPHORA

1924. *Polytrichophora* Cresson, Entom. News, XXXV, p. 161.

Polytrichophora boriqueni Cresson

1930. *Polytrichophora boriqueni* Cresson, Trans. Amer. Ent. Soc., XLI, p. 77. [Puerto Rico.]

Known only by the type series.

Polytrichophora setulosa (Cresson)

1918. *Discocerina setulosa* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 58. [Costa Rica.]

COSTA RICA: La Suiza, III, V, VI, (Pablo Schild), [Mel, 6]. PANAMA: Fort Clayton, IV 23, (R. C. Shannon), [USNM, 3].

Polytrichophora pulchra (Cresson)

1918. *Discocerina pulchra* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 56. [Costa Rica.]

HONDURAS: Balsamo Farm, Puerto Castilla, V 13, (R. H. Painter), [ANSP, 1]. PANAMA: Monte Lirio, IV 6; Piedro Miguel, Canal Zone, IV 10; (all R. C. Shannon), [all USNM, 14]. Tabago Island, II 22, (A. Busck), [USNM, 1].

DISCOCERINA

1835. *Discocerina* Macquart, Hist. Nat. Ins., Dipt., II, p. 527.

Subgenus **Discocerina**

Discocerina (Discocerina) obscurella nitidiventris Hendel

1918. *Discocerina obscurella* subsp. *parva* Cresson (not Loew), Trans. Amer. Ent. Soc., XLIV, p. 58. [Costa Rica.]

1919. *Discocerina parua,* Johnson, Bull. Amer. Mus. Nat. Hist., XLI, p. 447. [Jamaica.]

1930. *Discocerina nitidiventris* Hendel, Konowia, IX, p. 136. [Northern Argentina, Paraguay, Bolivia.]

1931. *Discocerina obscurella,* Cresson (not Fallen), Dipt. Pat. & So. Chile, VI, p. 90. [Argentina, Chile.]

1933. *Discocerina nitidiventris* Hendel, Rev. de Entom., III, p. 81. [Paraguay.]

1938. *Discocerina nitidiventris,* Cresson, Rev. de Entom., VIII, p. 28. [Brazil.]

CUBA: Guantanamo, II 10, (H. Skinner), [ANSP, 1]. Soledad, Cienfuegos, I, II, (C. T. & B. B. Brues), [Mel, 1]. PUERTO

Rico: Mayaguez, II 15–16; Mono Island, II 21–26; [AMNH, 6]. St. Thomas: II 8, (A. Busck), [USNM, 1]. Mexico: Guadalajara, VI 22, (J. F. McClendon), [ANSP, 2]. Guatemala: El Salto, Antigua, V 1, (J. M. Aldrich), [USNM, 1]. Costa Rica: La Suiza, IV–VI, (Pablo Schild), [Mel, 18]. San Jose, "V 15: VII" 9 (H. Schmidt); Higuito, San Mateo, (Pablo Schild), [USNM, 10]. Panama: Monte Lirio, IV 6; Bella Vista, IV 3; Juan Mina, Canal Zone, VIII 28; Pedro Miguel, C. Z., V 11; (all R. C. Shannon), [all USNM, 13]. Peru: (H. S. Parrish), [USNM, 1]. Argentina: Mendoza, [ANSP, 1].

Hendel's name is here used for the Neotropical representative of the Holarctic *obscurella* Fallen, 1813, although its validity even as a subspecies or variety is rather doubtful. However, although the width of the cheek is quite variable in typical *obscurella,* the Neotropical series shows more uniformity in this respect, being almost consistently narrow; the parafacies with little or no dilation ventrad. In other respects, the extent of variation is as may be found in the typical form. Now and then, however, we find individuals with broad cheek, the abdomen often entirely shining, and the coxae and femora more frequently black.

Discocerina (Discocerina) flavipes Cresson

1941. *Discocerina flavipes* Cresson, Entom. News, LII, p. 35. [California.]

Guatemala: Antigua, IV 2; El Salto, Antigua, VI; (all J. M. Aldrich), [all USNM, 5]. Costa Rica: Rio Siquiares, Turrucares, XII, (P. P. Calvert), [ANSP, 1]. Panama: Canal Zone —Barro Colorado, VII 9; Cano Saddle, Gatun Lake, V 13; Juan Mina, IV 28; Pedro Miguel, IV 10; (all R. C. Shannon), [all USNM, 11]. Monte Lirio, IV, (R. C. Shannon), [USNM, 5]. Colombia: Aracataca, II, (J. Ujhelyi), [MNH, 2]. Venezuela: Cariaquito, I, (S. Brown), [ANSP, 1]. Brazil: Rio de Janeiro, (H. H. Smith), [ANSP, 1].

This species, if it deserves such recognition, apparently has the same range in distribution as *nitidiventris,* but I have not seen it as far south as Argentine or Paraguay.

Although originally described from California, this form is probably more endemic in the neotropics than in the nearctic. It is

recognized, and differentiated from *nitidiventris* by the yellow coxae, femora and tibiae; rarely are the femora infuscated.

Discocerina (Discocerina) flavifrons Hendel

1930. *Discocerina flavifrons* Hendel, Konowia, IX, p. 137. [Bolivia.]
1936. *Discocerina flavifrons* Hendel, Ann. Naturh. Mus. Wien, XLVII, p. 104. [Brazil.]

I do not know this species, but apparently it is closely allied to *nitidiventris*.

Discocerina (Discocerina) sana Cresson

1931. *Discocerina sana* Cresson, Dipt. Pat. & So. Chile, VI, p. 90. [Chile.]

This species belongs to the *obscurella* assemblage in possessing the down-curved setulae on the parafacies, and is similar to *obscurella* in having the medifacies uniformly colored, but differing in its broad parafacies and cheek, which latter is about one-third height of eye; antennae mostly black; mesonotum and scutellum sparingly brown pollinose; femora and tibiae, black.

Discocerina (Discocerina) trilineata Cresson

1918. *Discocerina trilineata* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 57. [Costa Rica.]

This species is similarly allied to *obscurella,* but is quite different in having its shining black face marked with three niveous stripes. Because of the brevity of its original description, a more detailed one is here given.

Pale, yellow to tawny: frons at antennae, parafacies, antennae except segment III above, palpi, knees, apices of tibiae and tarsi except apices. Halteres white. Wings hyaline with pale veins.

Opaque except abdomen on dorsum, and femora and tibiae which are shining. Frons yellowish brown with lower orbits narrowly white. Face with three complete longitudinal stripes and the narrow parafacies densely niveous; occipital area dusted with white. Mesonotum and scutellum densely yellowish brown; pleura and metanotum black or faintly grayish.

Frons slightly longitudinal with parallel orbits; face narrower, three times as long as broad, with three to four meso-acclinate facials; parafacies not dilating ventrad. Cheek as in *nitida*. Antennae short, with III rotund; arista with five hairs. Mesonotal setulae not seriated; prescutellars minute; supra-alar wanting. Fore femur with flexor comb of three stout spinules. Abdomen ovate, acute apicad. Length, 1.7 mm.

Discocerina (Discocerina) nepos Cresson

1918. *Discocerina nepos* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 57. [Costa Rica.]

This species is known only by its unique female type, and although very similar to *trilineata,* it has a much longer second vein, a character which alone cannot be ignored as of specific value. It is larger (2.3 mm.) and more shining than *trilineata;* the pale anterior part of the frons is more extended, and the pruinose ocellar region distinctly defined; the parafacies are very narrowly niveous, leaving a broader bare, pale, more or less relieved line just laterad of the facials. In *trilineate,* the white orbital line of the frons extends to the vertex; the median facial stripe is broader. The mesonotal surface is somewhat shining through the gray dusting.

Subgenus **Lamproclasiopa**

1933. *Lamproclasiopa* Hendel, Rev. de Entom., III, p. 79.
1942. *Lamproclasiopa,* Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 115.

This subgenus of *Discocerina* was proposed by Hendel for the reception of his new species *facialis* from Bolivia and for the inclusion of those Discocerinae which are shining black with metallic reflections and which have the notopleura setulose, and the anterior notopleural bristle situated about ventrad of the dorsal angle of the depression. With *facialis,* Hendel included his previously described *chalybaca* which was originally placed in his subgenus *Gymnoclasiopa.* The position of the anterior notopleural is not a very positive character, but there seems to be some value in the absence or presence of the notopleural setulae although they are sometimes difficult to see and may be very few in number; the dorsal one or two are generally the only ones in evidence. On this ground I am using *Lamproclasiopa* for the present group of species.

These species are more shining with deeper metallic reflections than are those of *Discocerina* sens. strict., but the parafacies lack the characteristic down curved setulae. The facial series, as in *Discocerina* sens. strict., has three subequal facials; notopleura setulose, the anterior notopleural set ventrad of the sutural angle.

Discocerina (Lamproclasiopa) aracataca Cresson

1940. *Discocerina aracataca* Cresson, Notulae Nat., no. 35, p. 5. [Colombia.]

Known to me only by the female type from Aracataca, Colombia.

Discocerina (Lamproclasiopa) chalybea (Hendel)

1930. *Discocerina* (*Gymnoclasiopa*) *chalybea* Hendel, Konowia, IX, p. 138. [Argentina.]

1933. *Discocerina* (*Lamproclasiopa*) *chalybea* Hendel, Rev. de Entom., III, p. 80. [Paraguay.]

PARAGUAY: San Bernardino, II–III, (Barbarczy), [ANSP, 1].

Discocerina (Lamproclasiopa) obscura Williston

1896. *Discocerina obscura* Williston, Trans. Ent. Soc. London, 1896, p. 397. [St. Vincent.]

1928. *Discocerina obscura*, Curran, Sci. Surv. P. Rico & Virg. Isls., XI, (1), p. 63. [Puerto Rico.]

PUERTO RICO: Caey, IV; Mayaguez, II; Naguabo, III; [all AMNH, 12]. Mayaguez, II 16, (R. H. Van Zwalenburg; mining chrysanthemum), [USNM, 1]. CUBA: Guantanamo, V 17, (C. T. Ramsden), [ANSP, 1]. PANAMA: Monte Liro, IV 6, (R. C. Shannon), [USNM, 1]. BRAZIL: (H. H. Smith), [ANSP, 1].

Discocerina (Lamproclasiopa) univittata new species

A species very readily mistaken for *nitida* Cresson, particularly the more poorly preserved individuals, but in the better preserved material the face shows a bare black median line, whereas in *nitida* the medifacies is uniformly dusted. Furthermore, the mesonotum and scutellum as well as the frons are quite densely dusted, which almost completely obscures the glossy surface, with which the black sparingly dusted abdomen is strongly contrasted.

Pale, orange to yellow: antennae, parafacies, extremities of the femora and tibiae, and all tarsi. Wing veins also rather pale. Halteres white.

Frons, mesonotum and scutelum, rather densely dusted with brown to golden brown, almost totally obscuring the glossy surface; frontal and facial orbits more whitish; medifacies cinereous with a narrow black median stripe; the facialia also black. Pleurae somewhat cinereous; abdomen shining but somewhat dusted with brown and cinereous.

Structurally similar to *obscura*.

Type.—Male; Iquitos, Peru; March to April, 1931; (R. C. Shannon); [U. S. National Museum].

Paratypes.—3 ♀; topotypical.

Discocerina (Lamproclasiopa) facialis Hendel

1930. *Discocerina* (*Lamproclasiopa*) *facialis* Hensel, Rev. de Entom., III, p. 79. [Bolivia.]

This may be *Discocerina* (*Lamproclasiopa*) *nitida* Cresson.

Discocerina (Lamproclasiopa) nitida Cresson

1918. *Discocerina nitida* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 57, pl. 3, fig. 8. [Costa Rica.]

1938. *Discocerina nitida* Cresson, Rev. de Entom., VII, p. 29. [Colombia, Brazil, Paraguay.]

COSTA RICA: Higuito, San Mateo, (P. Schild); San Jose, VII, (H. Schmidt); [all USNM, 6]. Pedrogoso, (D. L. Rounds), [Mel, 2]. PANAMA: Belle Vista, IV 3; Monte Lirio, IV 6, 15; Barro Colorado, Canal Zone, VII 9; (all R. C. Shannon); Pedro Miguel, Canal Zone, IV 10, (R. C. Shannon); Tabernilla, Canal Zone, IV 16–27, (A. Busck); [all USNM, 32]. PERU: Iquitos, III–IV, (R. C. Shannon), [USNM, 1]. BRAZIL: Gaveo, Rio de Janeiro, III 31, (H. S. Lopez), [IOC, 3].

This may be *Discocerina* (*Lamproclasiopa*) *facialis* Hendel,[9] but that species is described as lacking the mesopleural and sternopleural bristles, a characteristic which I question, and, as far as I know, does not exist in this genus. These bristles were probably rubbed off.

Subgenus **Basila**

1942. *Basila* Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 116.

Discocerina (Basila) puella (Cresson)

1931. *Ditrichophora puella* Cresson, Dipt. Pat. & So. Chile, VI, p. 91. [Chile and Argentina.]

CHILE: Puerto Varas, Llanquihue, XII; (R. & E. Shannon), [USNM, 2]. ARGENTINA: Correntoso, Rio Negro, XI, (R. & E. Shannon), [USNM, 2].

Discocerina (Basila) bisetulosa (Cresson)

1939. *Ditrichophora bisetulosa* Cresson, Notulae Nat., no. 21, p. 7. [Paraguay.]

Known to me only by the type series from San Bernardino.

[9] Rev. de Entom., III, p. 79, 1930. *Discocerina facialis* has been previously used by Williston, 1896, for a species now assigned to *Hydrochasma*.

Discocerina (Basila) polita (Edwards)

1933. *Ditrichophora polita* Edwards, Dipt. Pat. & So. Chile, VI, p. 117. [Argentina.]

CHILE: Puerto Varas, Lanquihue, XII, (R. & E. Shannon), [USNM, 1].

A totally shining black species with base of tarsi yellow, and halteres white.

Discocerina (Basila) balsamae (Cresson)

1930. *Ditrichophora balsamae* Cresson, Entom. News, XLI, p. 77. [Honduras.]

Known to me only by the type series.

Discocerina (Basila) painteri (Cresson)

1930. *Ditrichophora painteri* Cresson, Entom. News, XLI, p. 76. [Honduras.]

BRAZIL: Gavea, Rio de Janeiro, III 29, (S. H. S. Lopez), [IOC, 6].

Discocerina (Basila) nana (Williston)

1896. *Discocerina nana* Williston, Trans. Ent. Soc. London, 1896, p. 396. [St. Vincent.]

1918. *Discocerina nana,* Cresson, Trans. Amer. Ent. Soc., XLI, p. 56. [Costa Rica.]

This interesting, easily recognized species is probably not a member of this subgenus.

COSTA RICA: La Suiza, V, IX, (P. Schild), [Mel, 3]. Pedregoso, (D. L. Rounds), [Mel, 1].

PECTINIFER

1944. *Pectinifer* Cresson, Noctula Nat., no. 135, p. 4.

Pectinifer aenea (Cresson)

1918. *Discocerina aenea* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 59. [Costa Rica.]

This species is known to me only by the type; and is the only Neotropical species I have seen belonging to the *Ditrichophora* assemblage.

Key to the Neotropical Species of the Tribe Discocerinini

1. Facialia with a secondary series of dorsolaterally inclined setae laterad of the primary series; eyes pilose (*Polytrichophora*).....20
   Facialia with no such secondary series.....2
2. Notopleura bare, with the anterior notopleural well cephalad, in the humeral angle, nearer the posterior notopleural than to the humeral; shining to polished species; fore femur stout with distinct antero-flexor comb of spinules.....*Pectinifer aenea* (Cresson)
   Notopleura setulose, with anterior notopleural removed caudad nearer the posterior one than to the humeral.....3
3. Shining to dark opaque species; parafacies relatively narrow; three or more subequal primary facials (*Discocerina*).....6
   Densely cinereous opaque species; parafacies relatively broad (*Hydrochasma*).....4
4. Fore femur with anterio-flexor comb of numerous minute spinules; mouth relatively large; costa II, 1.5 to 2 times as long as III
   Hydrochasma capax
   Hydrochasma patens
   Fore femur with anterio-flexor comb distally only and of a few minute spinules.....5
5. Costa II not 2 times as long as III; cheeks narrow; abdomen deeply velvety-black on dorsum.....*Hydrochasma leucoprocta* (Loew)
   Hydrochasma incisa (Coquillett)
   Costa II at least twice as long as III; cheeks broad; abdomen not deep velvety-black except in extreme dorsal aspect
   Hydrochasma ceraceps Cresson
6. Facial series of only 2 equally long, well separated setae; anterior notopleural well caudad, about ventrad of the sutural angle; supra-alar wanting (Subgenus *Basila*).....17
   Facial series of 3 or more equally long, rather approximate setae (except *aracataca*); anterior notopleural well cephalad in the anterior angle of notopleura; supra-alar usually present.....7
7. Frons with 2 pale blue or green stripes; face narrow, with polished black median and 2 niveous stripes; shining species with antennae and tarsi yellow.....*Basila nana* (Williston)
   Frons entirely or partly brown to grayish pollinose, without metallic blue or green stripes.....8
8. Parafacies with a series of ventrally curved setulae (Subgenus *Discocerina*).....9
   Parafacies bare (Subgenus *Lamproclasiopa*).....11
9. Parafacies and cheeks broad, the latter about .3 eye-height
   Discocerina sana Cresson
   Parafacies and cheeks narrow, the latter scarcely .2 eye-height.....10
10. Femora and generally the tibiae, black..*Discocerina nitidiventris* Hendel
    Femora and tibiae pale, yellow.....*Discocerina flavipes* Cresson

11. Medifacies with niveous stripes.....15
Medifacies unicolorous.....12
12. Relatively opaque species with 2 long subequal and 1 shorter facial setae.....*Lamproclasiopa aracataca* (Cresson)
Shining species with sparse thoracic vestiture which but slightly obscures the surface gloss.....13
13. Shining surface of mesonotum with metallic reflections
Lamproclasiopa chalybaea Hendel
Shining mesonotal surface without metallic coloring
Lamproclasiopa obscura Williston
14. Median stripe of mesofacies black; parafacies not setulose; mesonotum rather densely dusted.....*Lamproclasiopa univittata* new species
Median facial stripe niveous.....15
15. Mesonotum very sparsely dusted; parafacies not setulose
Lamproclasiopa nitida (Cresson)
Mesonotum densely dusted; parafacies setulose.....16
16. Costa II at least twice as long as III; large (2.25 mm.) species
Discocerina nepos Cresson
Costa II at most one and one-half times as long as III; smaller species
Discocerina trilineata Cresson
17. Wings maculate.....18
Wings immaculate.....19
18. Antennae and tibiae yellow, small (2 mm.) species
Basila bisetulosa (Cresson)
Antennae and tibiae black, larger species.....*Basila polita* (Edwards)
19. Mesonotum with 4 series of isolated brown spots
Basila balsamae (Cresson)
Mesonotum with 5 to 7 brown vittae.....*Basila painteri* (Cresson)
20. Face very narrow, medianly yellowish; parafacies black with niveous orbits.....21
Face broad, unicolorous, or orbits but slightly lighter
Polytrichophora setulosa (Cresson)
21. Mesonotum opaque; facialia black...*Polytrichophora pulchra* (Cresson)
Mesonotum shining; facialia not much discolored
Polytrichophora boriqueni Cresson

Tribe Psilopini

1942. *Psilopini,* Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 105.

RHYSOPHORA

1924. *Rhysophora* Cresson, Entom. News, XXXV, p. 159.

The two following species might easily be erroneously placed in or near *Discocerina* sens lat., but Loew was more nearly correct in assigning them to *Psilopa,* but they are certainly not members of that genus. Why Loew did not place them in *Discocerina* I

cannot understand, except that he was influenced by the absence of the facial foveae and carina.

They are here assigned to *Rhysophora* but may prove to be entitled to separate generic recognition, allied to the Oriental *Actocetor*.

There are two proclinate frontorbitals, of which the anterior one is the stronger and in advance of the line of the reclinate frontal; postocellars small; facialia setulose, with a primary series of four or more meso-aclinate facials; parafacies linear. Thorax with strong supra-alar. Wings with distinct costal infuscation.

Rhysophora unbrosa (Loew)

1862. *Psilopa umbrosa* Loew, Monogr. Dipt. No. Amer., I, p. 143. [Cuba.]

Known to me only by the type in the Loew Collection. It is distinguished from *caeruleiventris* by the brown frons and mesonotum, and the black abdomen.

Rhysophora caeruleiventris (Loew)

1862. *Psilopa caeruleiventris* Loew, Monogr. Dipt. No. Amer., I, p. 144. [Cuba.]

What is probably the type of this species was found in the Loew Collection, without name label. It is in agreement with the original description. Also before me is a female from Nassau, Bahama Islands, July 27, (C. W. Johnson), which differs from the above mentioned "type" in having the scutellum gray, not brown, and the infuscation of the wings is not so extended. The species differs from *umbrosa* in its gray frons and mesonotum, and the metallic purple abdomen.

CLASIOPELLA

1914. *Clasiopella* Hendel, Suppl. Entom., III, p. 109.

Clasiopella uncinata Hendel

1914. *Clasiopella uncinata* Hendel, Suppl. Entom., III, p. 110, fig. 4–5. [Formosa.]

An Old World species, primarily of the Pacific Islands. It is recorded here because of a specimen before me said to have been captured on an aeroplane reaching Florida from the West Indies. It probably was thus carried from Africa where the species has also been taken.

HELAEOMYIA

1941. *Helaeomyia* Cresson, Entom. News, LII, p. 35.
1941. *Mimapsilopa* Cresson, Entom. News, LII, p. 36.

This genus is possibly not generically distinct from *Clasiopella*. It here includes those species having a subhemispherically convex face, with broad rounded interfoveal carina, which practically obliterates the true antennal foveae. The species approach *Psilopa* in many respects but they have two subequal facials, the uppermost set rather high, at about mid facial profile.

There seems to be no satisfactory grounds, at least from our present knowledge of its species, upon which *Mimapsilopa* can be considered generically or subgenerically distinct. Its genotype, *metatarsata,* is not greatly differentiated from *petrolei* Coquillett, the genotype of *Helaeomyia.*

It is not improbable that other species of this genus are, as is *petrolei,* associated with petroleum.

Helaeomyia nigra (Williston)

1896. *Psilopa nigra* Williston, Trans. Ent. Soc. London, 1896, p. 139, pl. 13, fig. 139. [St. Vincent.]
1942. *Helaeomyia nigra,* Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 124. Generic change.

CUBA: Cabanas, Pinar del Rio, IX 5–8, [AMNH, 1]. ST. THOMAS: Charlotte Analie, IV 2, (H. Morrison), [USNM, 1]. TRINIDAD: Port of Spain, (J. Ujhelyi), [MNH, 2].

The face is somewhat rugose, with fore metatarsus yellow.

Helaeomyia metatarsata (Cresson)

1939. *Clasiopella metatarsata* Cresson, Notulae Nat., no. 21, p. 8. [Panama.]

A species differing from *nigra* in its smooth face and white fore metatarsus, and the wings are immaculate.

Helaeomyia schildi (Cresson)

1944. *Psilopa schildi* Cresson, Notulae Nat., no. 135, p. 5. [Costa Rica.]

Differing from *metatarsata* in having the apical part of the wings infumated with its basal limit sharply defined. The face is less strongly convex than in the other species.

PSILOPA

1823. *Psilopa* Fallen, Dipt. Suec., Hydrom., p. 6.

Psilopa (Psilopa) pulchripes Loew

1878. *Psilopa pulchripes* Loew, Zeits. f. Gesam. Naturw. Berlin, LI, p. 197. [Texas.]

1926. *Psilopa unica* Cresson, Trans. Amer. Ent. Soc., LI, p. 250. [Paraguay.]

1928. *Psilopa unica*, Curran, Sci. Surv. P. Rica & Virg. Isls., XI, (1), p. 60. [Puerto Rico.]

PANAMA: Fort Clayton, IV 23, (R. C. Shannon), [USNM, 1]. COLOMBIA: Baranquilla, III, (J. Ujhelyi), [ANSP, 1]). BOLIVIA: Piedra Blanca, IV, [Mel, 1].

This species has only the basal segment of the fore tarsi white, thus distinguishing it from its Nearctic relative, *P. dupla* Cresson, which has the two basal segments white.

Psilopa desmata Williston

1896. *Psilopa desmata* Williston, Trans. Ent. Soc. Lond., 1896, p. 395. [St. Vincent.]

This species is unknown to me. It was described from a unique male, and Williston expressed a doubt in placing it in *Psilopa* rather than *Discocerina*.

A black, mostly shining species with the antennae, distal part of femora, all tibiae and tarsi, pale. The face has four to five facials.

Psilopa metallina Becker

1919. *Psilopa metallina* Becker, Arc. Merid. Equat. Amer. du Sud, IX, p. 203. [Ecuador.]

Another species unknown to me, nor can I place it in any of the Psilopine genera. It was described on ten individuals of both sexes from several localities in Ecuador.

Psilopa nigropuncta Williston

1896. *Psilopa nigropuncta* Williston, Trans. Ent. Soc. Lond., 1896, p. 393. [St. Vincent.]

This may be *Psilopa dimidiata* Cresson or *P. olga* Cresson,[10] or at least related to them. The "densely light grey-pollinose" face suggests *olga*, but the structure of the upper part of the face does not agree with that of *dimidiata*. The species was described from a unique male, and is unknown to me.

[10] Entom. News, XXXIII, p. 137, 1922.

LEPTOPSILOPA

1922. *Leptopsilopa* Cresson, Entom. News, XXXIII, p. 136.

Leptopsilopa lineanota Cresson

1922. *Leptopsilopa lineanota* Cresson, Entom. News, XXXIII, p. 136. [Panama.]

COSTA RICA: La Suiza, VII, (P. Schild), [Mel, 1].

Fore coxa, mid and hind femora, yellow; wings with a longitudinal fuscous stripe in first posterior cell.

Leptopsilopa similis (Coquillett)

1900. *Psilopa similis* Coquillett, Can. Entom., XXXII, p. 33. [Florida.]
1938. *Leptopsilopa similis,* Cresson, Rev. de Entom., VIII, p. 31. [Brazil.]

CUBA: Guantanamo, II 10, (H. Skinner), [ANSP, 1]. MEXICO: Motzarongo, Vera Cruz, II, (H. Osborn); San Rafael, III, (C. H. T. Townsend); [all USNM, 2]. COSTA RICA: La Suiza, II, III, VI, VII, (P. Schild), [Mel, 14]. Higuito, San Mateo, (P. Schild); San Jose, V 15, XI 20, (H. Schmidt), [USNM, 28; ANSP, 1]. Surubres, 300 m. alt., (H. Heyne), [DEI, 8]. PANAMA: Alajuela, III 4; Canal Zone—Corozal, III 1; Frijoles, X 23; Paraiso, I 17–II 7; Tabernilla, II 6, IV 27; (all A. Busck); Porto Bello, II 15, (E. A. Schwarz); [all USNM, 11].

The wings have large clouds over the posterior crossvein and at apex. Only the fore tibia and tarsi are black.

Leptopsilopa atrimana (Loew)

1878. *Psilopa atrimana* Loew, Zeits. f. Gesam. Naturn., Berlin, LI, p. 197. [United States.]
1942. *Leptopsilopa atrimana* Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 126. Generic change.

CUBA: Havana, [Mel, 2]. GUATEMALA: Antigua, IV 2, (J. M. Aldrich), [USNM, 3].

This species has not been previously reported south of the United States. The fore legs including the coxae are black; mid and hind legs are yellow; at most only the first posterior crossvein is clouded.

Leptopsilopa subapicalis Cresson

1922. *Leptopsilopa subapicalis* Cresson, Entom. News, XXXIII, p. 136. [Trinidad.]

1938. *Leptopsilopa subapicalis* Cresson, Rev. de Entom., VIII, p. 31. [Panama, Colombia and Brazil.]

HONDURAS: Le Ceila, (F. J. Dyer), [USNM, 7]. PANAMA: Rio Trinidad, III 16; Canal Zone—Corozal, III 1; Frijoles, X 23; Paraiso, II 7, Tabernilla, VI 25; (all A. Busck), [all USNM, 7]. COSTA RICA: Higuito, San Mateo, (P. Schild), [USNM, 1]. BRAZIL: Friburro, Est. de Rio, IV 22, (H. S. Lopez), [IOC, 6]).

The fore coxae and all femora, yellow; wings with a subapical fuscous fascia.

Leptopsilopa nigrimana (Williston)

1896. *Psilopa nigrimana* Williston, Trans. Ent. Soc. London, 1896, p. 393. [St. Vincent.]

1897. *Psilopa nigrimana* Williston, Kans. Univ. Quart., v, p. 4. [Brazil.]

1900. *Psilopa nigrimana* Coquillett, Proc. U. S. Nat. Mus., XXII, p. 260. [Puerto Rico.]

1918. *Psilopa willistoni* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 53. [Costa Rica.] New name.

1919. *Psilopa willistoni* Johnson, Bull. Amer. Mus. Nat. Hist., XLI, p. 447. [Jamaica.]

1928. *Leptopsilopa willistoni* Curran, Sci. Surv. P. Rico & Virg. Isls., XI, (1), p. 61. [Puerto Rico.]

1938. *Leptopsilopa nigrimana* Cresson, Rev. de Entom., VIII, p. 31. [Ecuador, Peru, Brazil and Argentina.]

BAHAMAS: Nassau, VI, [USNM, 1; Johns, 2]. CUBA: Baracoa, IX, (A. Busck), [USNM, 1]. Guantanamo, II 10, (H. Skinner); V 7, (C. T. Ramsden); [all ANSP, 3]. HAYTI: [USNM, 1]. PUERTO RICO: Bayamon, I; Utuado, I; (all A. Busck); [all USNM, 4]. BARBADOS: (T. R. Bovell; leaf mines in sweet potatoes), [IIE, 1]). TRINIDAD: VI 20, (A. Busck), [USNM, 1]. MEXICO: Minatitlan, II (H. Osborn); Tampico, XI 6, 29, (Bishopp); [all USNM, 32]. NICARAGUA: Managua, (C. F. Baker), [USNM, 3]. COSTA RICA: San Jose, VII, (H. Schmidt), [USNM, 1]. PANAMA: Corozal, Canal Zone, II 1, (A. Busck), [USNM, 1]. ECUADOR: (H. A. Parrish), [USNM, 3]. BRAZIL: Rio de Janeiro, IX, (H. S. Lopez), [IOC, 1].

The fore coxae are yellow; all femora dark; wing immaculate.

Leptopsilopa nigricoxa Cresson

1922. *Leptopsilopa nigricoxa* Cresson, Entom. News, XXXIII, p. 136. [Paraguay.]

1938. *Leptopsilopa nigricoxa* Cresson, Rev. de Entom., VIII, p. 31. [Brazil.]

HONDURAS: Truxillo, IV 11, (R. H. Painter), [ANSP, 1]. BRAZIL: Bonito, II, [USNM, 1].

The fore coxae, and their tibiae and tarsi are black; fore femur mid and hind legs are yellow; wings with apical infuscation.

CEROPSILOPA

1917. *Ceropsilopa* Cresson, Entom. News, XXVIII, p. 340.

1940. *Batula* Cresson, Notulae Nat., no. 38, p. 2.

The genotype of *Batula, Ceropsilopa mellipes* (Coquillett), has some features quite different from *Ceropsilopa nasuta* Cresson, but the lack of good series of the species of this assemblage makes it difficult to positively draw the line between the two groups which these species represent.

Ceropsilopa dispar Cresson

1922. *Ceropsilopa dispar* Cresson, Entom. News, XXVIII, p. 135. [California.]

BAJA CALIFORNIA: Isla Raza, Gulf of California, IV 21, (E. P. VanDuzee), [CAS, 1].

Ceropsilopa mellipes (Coquillett)

1900. *Psilopa mellipes* Coquillett, Proc. U. S. Nat. Mus., XXII, p. 260. [Puerto Rico.]

1928. *Ceropsilopa mellipes,* Curran, Sci. Surv. P. Rico & Virg. Isls., XI, (1), p. 61. [Puerto Rico.]

1940. *Batula mellipes* Cresson, Notulae Nat., no. 38, p. 3. Generic change.

CUBA: Guantanamo, II 10, (C. T. Ramsden), [ANSP, 1].

Ceropsilopa coquilletti Cresson

1922. *Ceropsilopa coquilletti* Cresson, Entom. News, XXXIII, p. 136. [California.]

1928. *Ceropsilopa coquilletti,* Curran, Sci. Surv. P. Rico & Virg. Isls., XI, (1), p. 61. [Puerto Rico.]

BAHAMAS: Andrus, VIII 2, [Johns, 1]. PUERTO RICO: Arroyo, II; Utuado, 1; (all A. Busck); [all USNM, 3; paratypes of *Psilopa mellipes* Cop.]. TRINIDAD: Port of Spain, (J. Ujehlyi), [MNH, 3]. YUCATAN: Progreso, XII 11, [USNM, 1]. COLOMBIA: Baranquilla, III, (J. Ujehlyi), [MNH, 2].

Ceropsilopa nasuta Cresson

1917. *Ceropsilopa nasuta* Cresson, Entom. News, XXVIII, p. 341. [Trinidad.]

CUBA: Guantanamo, V 7, (C. T. Ramsden), [ANSP, 1]. PUERTO RICO: Arecibo, III 1–4; Adjuntas, VI 8–13; Manati, III 5; Naguabo, III 7–9; [all AMNH, 4]. BRAZIL: Recr. Bandern, Rio de Janeiro, XI, (H. de Souza Lopes), [IOC, 2].

Ceropsilopa adjuncta Cresson

1925. *Ceropsilopa adjuncta* Cresson, Entom. News, XXXVI, p. 165. [Puerto Rico.]

1928. *Ceropsilopa adjunta* Curran, Sci. Surv. P. Rico & Virg. Isls., XI, (1), p. 61. [Puerto Rico.]

FLORIDA: Paradise Key, II, 14, (S. W. Frost), [ANS, 1]. Royal Palm Park, I. 24, 25, 29, (A. L. Melander), [Mel. 4].

PELTOPSILOPA

1914. *Peltopsilopa* Hendel, Deuts. Ent. Zeits., 1914, p. 156.

Peltopsilopa aspistes Hendel

1914. *Peltopsilopa aspistes* Hendel, Deuts. Ent. Zeits., 1914, p. 158, figs. 5, 6, 7. [Colombia.]

TRINIDAD: III, XI, (A. N. Gwyn), [IIE, 2].

Peltopsilopa schwarzi Cresson

1922. *Peltopsilopa schwarzi* Cresson, Entom. News, XXXIII, p. 135. [Cuba.]

Differs from *aspistes* in being highly polished with colored metallic reflections.

PLAGIOPSIS

1918. *Plagiops* Cresson (not Townsend, 1911), Trans. Amer. Soc., XLIV, p. 53.

1936. *Plagiopsis* Cresson, Trans. Amer. Ent. Soc., LX, p. 201. Renamed.

Plagiopsis meridionalis (Cresson)

1918. *Psilopa meridionalis* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 52. [Costa Rica.]

Similar to some species of *Psilopa,* but the ocellars are situated between the posterior ocelli and the halteres are black. Frontorbitals are well developed and the face is convex, not subsulcate.

Plagiopsis skinneri (Cresson)

1922. *Psilopa skinneri* Cresson, Entom. News, XXXIII, p. 136. [Cuba.]

1928. *Psilopa skinneri,* Curran, Sci. Surv. P. Rico & Virg. Isls., XI, (1), p. 60. [Puerto Rico.]

CUBA: Soledad, Cienfuegos, I–II, (C. T. & B. Brues), [Mel, 1]. Cayamas; Havana; (all C. F. Baker); [all USNM, 9]. North of Vinales, IX, [AMNH, 1]. PUERTO RICO: Bayamon, II; Fajardo, II; Utuado, I; Vieques Island, II; (all A. Busck), [all USNM, 4]. Tao Baia, IV, (G. Garbo), [Cornell, 6]. PANAMA: Tabago Island, II 26, (A. Busck), [USNM, 1]. BRAZIL: Grajahii, Rio de Janeiro, VIII 27, (H. S. Lopez), [IOC, 1]. PARAGUAY: San Bernardino, II–III, (Babarczy), [MNH, 6].

Psilopa-like in fronto-facial profile; mesonotum and scutellum smooth or weakly sculptured; face with sparse pollen medianly; facials in minute pits.

Plagiopsis hinei (Cresson)

1922. *Plagiops hinei* Cresson, Entom. News, XXXIII, p. 135. [Guatemala.]

MEXICO: Tampico, XII, [INHS, 4].

Fronto-facial profile convex, *Psilopa*-like; frontorbital well developed; mesonotum, scutellum and face densely granulose or aciculate.

Plagiopsis nitidifrons (Cresson)

1918. *Plagiops nitidifrons* Cresson, Trans. Amer. Ent. Soc., XLIV, p. 54. [Costa Rica.]
1928. *Plagiops nitidifrons,* Curran, Sci. Surv. P. Rico & Virg. Isls., XI, (1), p. 62. [St. Croix Island, and Paraguay.]
1931. *Plagiops nitidifrons,* Hendel, Konowia, IX, p. 141. [Paraguay.]
1938. *Plagiopsis nitidifrons* Cresson, Rev. de Entom., VIII, p. 30. [Brazil and Paraguay.]

The records of Curran and Hendel are probably correct. I have not seen their material.

COSTA RICA: Pedregoso, (D. L. Rounds), [Mel. 2]. PANAMA: Corozal, Canal Zone, III 2, (A. Busck), [USNM, 1]. BRITISH GUIANA: Rockstone, VII 9, [AMNH, 1]. BOLIVIA: Rosario Lake, Rogagua, IX 9, (W. M. Mann), [USNM, 1]. BRAZIL: Rio de Janeiro, VIII 3; Grajanu, Rio de Janeiro, VI 20; (all H. S. Lopez), [all IOC, 6].

This species is distinguished by the very weakly sculptured, polished, mesonotum and the convex scutellum with its surface similarly polished.

This may be *Psilopa metallica* of Williston [11] not of Schiner, but unless the important characters separating the species of this genus are noted, it is merely presumptive to assume what the previous students had before him. Williston mentions the frons being aciculated but none of the individuals I have seen of this species has this feature. *Psilopa hinei* is similar in this respect, but it does not have a shining, metallic green face as Williston describes. It is probable that he had the present species under Schiner's name if we consider that he knew Loew's *aciculata,* which seems probable judging from the description he gives of that species. He, however, acknowledged that "there are some discrepancies from Schiner's description" in the specimens he (Williston) had as *metallica.*

Plagiopsis aciculata (Loew)

1862. *Psilopa aciculata* Loew, Monogr. Dipt. N. Amer., I, p. 142. [Cuba.]
1868. *Ephygrobia metallica* Schiner, K. Svenskz Freg. Novara Resa, Dipt., p. 242. [Venezuela.] Syn., by Cresson, 1925.
1896. *Psilopa aciculata* Williston, Trans. Ent. Soc. London, 1896, p. 394, pl. 13, fig. 14. [St. Vincent.]
1900. *Psilopa aciculata* Coquillett, Proc. U. S. Nat. Mus., XXII, p. 260. [Puerto Rica.]
1910. *Psilopa aciculata* Raguez, Mis. Trab. Acad. Cie. Nat. Habana, 1909, p. 156. [Cuba.] [12]
1919. *Psilopa aciculata* Johnson, Bull. Amer. Mus. Nat. Hist., XLI, p. 447. [Jamaica.]
1925. *Plagiops aciculata,* Cresson, Trans. Amer. Ent. Soc., LI, p. 244. Synonymizing *E. metallica* Schiner.
1928. *Plagiops aciculata,* Curran, Sci. Surv. P. Rico & Virg. Isls., XI, (1), p. 62. [Puerto Rico.]

CUBA: Cayamas, III 10, (E. A. Schwarz), [USNM, 2]. Guantanamo, II 10, (H. Skinner), [ANSP, 6]. San Carlos Est., X 4–8, [AMNH, 2]. Soledad, Cienfuegos, I–I, (C. T. Brues), [Mel, 2]. HAITI: [Mel, 2]. PUERTO RICO: Arroyo, II, (A. Busck), [USNM, 1]. JAMAICA: Battersea, II, (R. Thaxter), [Mel, 1]. TRINIDAD: Monserat, VI 29, (A. Busck), [USNM, 1]. Port of Spain, (J. Ujhelyi), [MNH, 1]. MEXICO: Motzorongo, Vera Cruz, II, (H. Osborn); Pueblo Viejo, Vera Cruz,

[11] Kans. Univ. Quart., VI, p. 4, 1897.
[12] I have no doubt but that Raguez's record applies to *aciculata* and not *nitidifrons.* The latter has not, to my knowledge, been reported from the West Indies.

XII 8, (F. C. Bishop); San Rafael, III 14, (C. H. T. Townsend); [all USNM, 5]. GUATEMALA: Puerto Barrios, III 3–4, (J. S. Hine), [OSU, 4]. NICARAGUA: Managua; San Marcos; (all C. F. Baker); [all USNM, 2]. COSTA RICA: La Suiza, IX, (P. Schild), [Mel, 1]. Higuito, San Mateo, (P. Schild); San Jose, (H. Schmidt); [all USNM, 2]. PANAMA: Canal Zone—Corozal, III 1, (A. Busck); Fryoles, X 22; Paraiso, I 17–III 25, (A. Busck & E. A. Schwarz); Tabernilla, IV 22, (A. Busck); [all USNM, 22]. COLOMBIA: Aracataca, II (Ujhelyi), [MNH, 3]. VENEZUELA: La Piedrita, II 16, (S. Brown), [ANSP, 1]. BRAZIL: Pernambuco, [USNM, 1].

The subopaque, granulose or aciculated sculpturing of the mesonotum and scutellum, distinguishes this species from its similar associate, *nitidifrons*.

Key to the Neotropical Species of the Tribe Psilopini

1. Scutellum enormously developed, concealing the greater part of the abdomen ..... **Peltopsilopa**
   Scutellum normal, not concealing any part of the abdomen 2
2. Supra-alar present and strong; facialia with 4 or more facials; large (4 mm.) species with costal portion of the wings infuscated
   Rhysophora umbrosa (Loew)
   Rhysophora caeruleiventris (Loew)
   Supra-alar absent or minute; face with only 1 to 2 facials 3
3. Antenna I elongate, well exserted; II inversely conical, without superior marginal bristle-bearing produced angle, at most with curved hair-like seta at that place; III often very long and narrow (*Ceropsilopa*) 19
   Antenna I seldom visibly exserted; II more or less trigonal with stout superior marginal seta, or spine 4
4. Halteres dark; wings yellow with base generally blackish; ocellars small, set between posterior ocelli (*Plagiopsis*) 16
   Halteres white; frontal well developed; ocellars generally set cephalad of posterior ocelli 5
5. Face with 2 strong, sometimes equally long facials; medifacies transversely carinate or medianly tumid (*Helaeomyia* and *Clasiopella*) . 12
   Face with but one facial, sometimes a minute seta ventrad; medifacies not tumid, but may be longitudinally weakly carinate on ventral part 6
6. The strong facial well ventrad of mid-facial profile; midifacies smooth; fore metatarsus white ..... **Psilopa pulchripes** Loew
   The strong facial at mid-facial profile; medifacies rugulose (*Leptopsilopa*) 7

7. Fore coxa pale, yellow.....8
   Fore coxa black.....11
8. Mid and hind femora blackened; wings immaculate
   Leptopsilopa nigrimana (Williston)
   Mid and hind femora pale; wings distinctly marked.....9
9. Infuscation of wing in form of a longitudinal stripe occupying first posterior cell; wings narrow.....**Leptopsilopa lineanota** Cresson
   Infuscation in form of discal and apical clouds.....10
10. Discal cloud large, cloud at apex in form of a spot at end of vein II
    Leptopsilopa similis Cresson
    Discal cloud small, the other in form of a fascia before end of vein II
    Leptopsilopa subapicalis Cresson
11. All femora yellow; wing with apical cloud
    Leptopsilopa nigricoxa Cresson
    Only mid and hind femora entirely yellow; wing immaculate except posterior crossvein.....**Leptopsilopa atrimana** (Coquillett)
12. Legs entirely yellow.....**Clasiopella uncinata** Hendel
    At least femora black.....13
13. Wings distinctly infumated apically...**Helaeomyia schildi** (Cresson)
    Wings immaculate.....14
14. Face smooth; fore metatarsus white
    Helaeomyia metatarsata (Cresson)
    Face somewhat rugulose; fore metatarsus yellow
    Helaeomyia nigra (Williston)
15. Frontal and frontorbital minute; face highly polished.....18
    Frontal and frontorbital well developed.....16
16. Face, mesonotum and scutellum, roughened
    Plagiopsis hinei (Cresson)
    Face, mesonotum and scutellum smooth, shining, or very weakly sculptured.....17
17. Tibiae mostly black; face polished..**Plagiopsis meridionalis** (Cresson)
    Tibiae mostly pale; face somewhat sculptured, the facials in minute pits.....**Plagiopsis skinneri** (Cresson)
18. Mesonotum and scutellum, subopaque, granulose or aciculated
    Plagiopsis aciculata (Loew)
    Mesonotum and scutellum, smooth and polished, at most weakly aciculated.....**Plagiopsis nitidifrons** (Cresson)
19. Femora and tibiae black; antennal seta small to minute.....21
    Femora and tibiae pale, yellow; face shining, without any vestiture except sometimes on parafacies.....20
20. Face narrow, wrinkled, longitudinally obtuse carinate; antennal seta small to minute.....**Ceropsilopa coquillett** Cresson
    Face broader, smooth, evenly convex, at most slightly prominent at mid-profile; antennal seta long..**Ceropsilopa mellipes** (Coquillett)

21. Face rather narrow; obtusely carinate, prominent above facials; frons not depressed; tibiae mostly pale; antennae very long; arista with 11 hairs.....**Ceropsilopa nasuta** Cresson
Face rather abruptly, subgibbosely prominent above facials; frons not or but slightly depressed at antennae; tibiae mostly pale; antennae short, segment III not twice as long as II; arista with 8 hairs.....**Ceropsilopa adjuncta** Cresson
Face rather broad, evenly convex; frons strongly depressed above antennae; tibiae mostly black; antennae long, segment III more than twice as long as II; arista with about 6 hairs
Ceropsilopa dispar Cresson

Discomyzini

1942. *Discomyzini* Cresson, Trans. Amer. Ent. Soc., LXVIII, p. 104.

DISCOMYZA

1830. *Discomyza* Meigen, Syst. Beschr. Europ. Zweifl. Ins., VI, p. 76.

Discomyza maculipennis (Wiedemann)

1824. *Notiphila maculipennis* Wiedemann, Anal. Entom., p. 57. [East Indies.]
1862. *Discomyza balioptera* Loew, Monogr. Dipt. No. Amer., I, p. 140. [Cuba.] Syn. by Cresson, 1925.
1908. *Discomyza maculipennis* Meijere, Tijds. v. Entom., LI, p. 166. Generic change.
1925. *Discomyza maculipennis* Cresson, Trans. Amer. Ent. Soc., LI, p. 242. Syn. *D. balioptera.*

The occasion for reporting this species here is *Discomyza balioptera* which Loew described from Cuba. I have seen the type of *balioptera,* a male in the Museum of Comparative Zoology, with Gundlach-Poey label 74/217, and two other specimens, in the same collection, from Cuba (Poey nos. 196 and 348). These I found to be conspecific with *maculipennis* from Indo-Malayan localities.

It is remarkable that this species should be found, so isolated and far from its normal range. *Maculipennis* was originally described from the East Indies and has since been redescribed under several names, from Celebes, Singapore, Java and other adjacent islands. Could it be possible that Gundlach's and Poey's material was incorrectly labeled, or, the specimens Loew had were introduced by some vessel from the Orient? We know that *Discomyza incurva,* a relative of the present species, is associated with the European edible snail.

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